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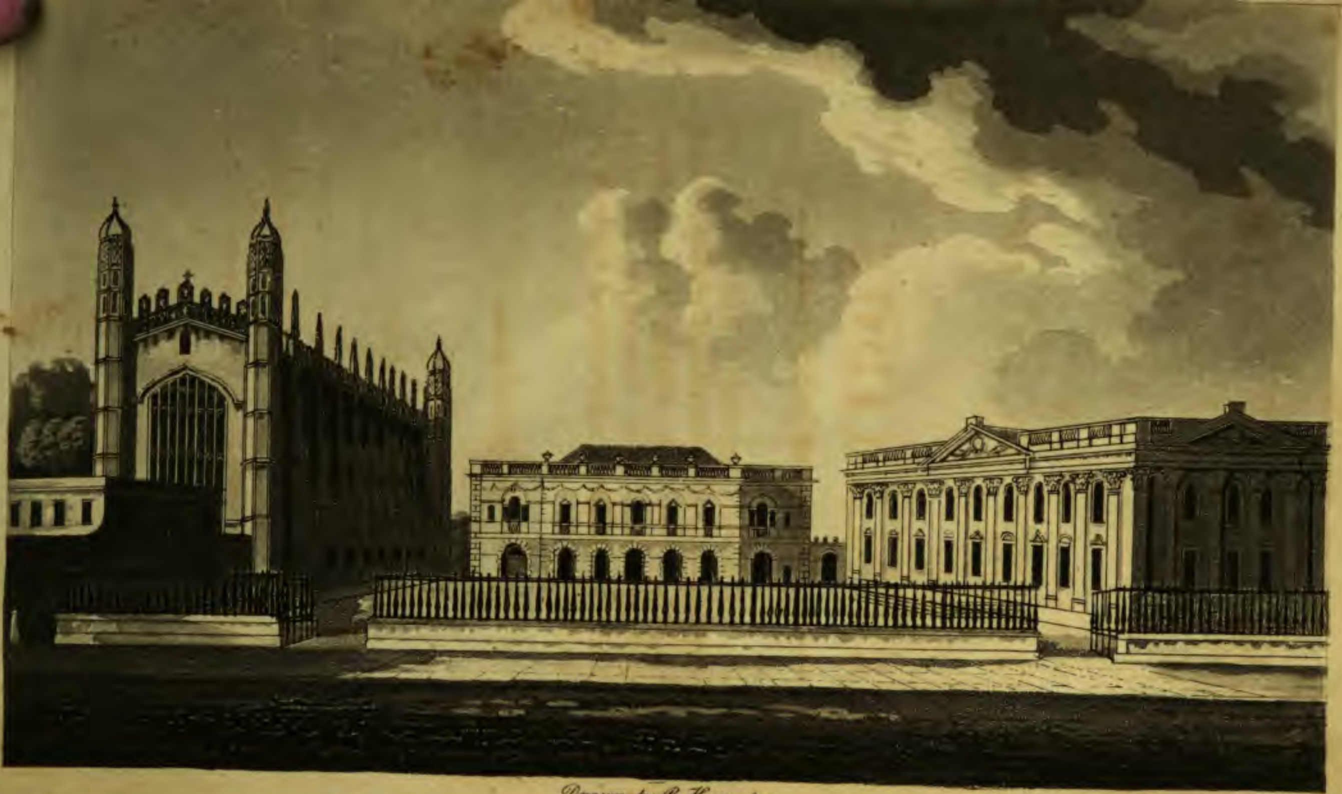
Part 1

THE

NEW CAMBRIDGE GUIDE.



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THE NEW

CAMBRIDGE GUIDE;

OR A

DESCRIPTION

OF THE

UNIVERSITY, TOWN, AND COUNTY

OF

CAMBRIDGE.

Containing, correct and comprehenſive deſcriptions of the Public Buildings, Colleges, Churches, Curioſities, &c. &c. Alſo a conciſe account of the different Orders, Degrees, Ceremonies, and Offices of the Univerſity; a liſt of the preſent Univerſity Officers; and a variety of articles of general utility.

Cambridge;
PRINTED BY M. WATSON.

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ADVERTISEMENT.

As the public are already in poſſeſſion of a *Deſcription of Cambridge*, the preſent publication may be deemed ſuperfluous; the Editor therefore thinks it neceſſary to explain his reaſons for undertaking it. His principal motive is to furniſh ſtrangers with a *Guide*, more correct and more generally uſeful, than any work of the kind that has preceded it; to effect which, he has reſorted to the moſt approved works, and drawn his information on the reſpective ſubjects from the moſt indiſputable ſources. The Editor was alſo ſtimulated with a wiſh to render his little tract more particularly adapted to the deſign of ſuch a publication; he has therefore omitted many articles which appeared tedious and unintereſting, if not uſeleſs; and has, on the other hand, added ſeveral pieces of intelligence, of univerſal advantage and utility:

as for inſtance, in the long catalogues of paintings contained in the Colleges and Lodges he has noticed thoſe only more eſpecially worthy of obſervation; and it muſt alſo be allowed, that the long liſts of Biſhops, &c. who have been educated here, can afford little entertainment to thoſe who viſit the Univerſity; therefore, the names of thoſe only who have diſtinguiſhed themſelves as Authors, or otherwiſe, have been ſelected for the *New Cambridge Guide*. Laſtly, in order to render the publication more extenſively convenient, it is publiſhed at a much cheaper rate than any other extant; and the Editor has been careful to include every article that can intereſt or amuſe, without encumbering it with tedious and unneceſſary ſubjects, which might ſwell the volume; or filling it with engravings, which would ſerve to render it expenſive.

If his endeavours have attained their purpoſe; that of aſſiſting thoſe who viſit Cambridge, to view the different objects with the greateſt pleaſure and convenience; his wiſhes will be ſatisfied and his intention anſwered.

The Editor cannot conclude this addreſs, without mentioning his obligations to Mr. RAWORTH's uſeful and intereſting publication, the "*Cambridge Univerſity Calendar*;" which has ſpared him an infinite deal of labour, and afforded him an appropriate and amuſing *Introduction*.

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THE NEW CAMBRIDGE GUIDE, &c. &c.

ORIGIN OF THE UNIVERSITY.

THE origin of this celebrated ſeat of learning has been much diſputed; and is ſo enveloped in the obſcurity of the times, that the moſt diligent reſearches have never been able to aſcertain it indiſputably. Without relating therefore, the numerous accounts which have been recorded concerning it; many of which are manifeſtly fabulous, and many of doubtful authority; we ſhall merely relate the moſt popular opinions.

The ſupporters of its antiquity have affirmed that it was founded by Cantaber, a Spaniard, 375 years before the birth of Chriſt; but it appears the honour of founding the Univerſity is due to Sigebert, King of the Eaſt—Angles, 630 years after Chriſt; who inſtituted a School for the inſtruction of Youth, which moſt Authors have agreed to place at Cambridge; but the tumultuous ſpirit of the times prevented its peaceful continuance, for it is ſaid to have been ſeveral times demoliſhed and revived again by ſucceeding generations: though the principal merit of reſtoring it belongs to Edward the Elder, who appointed Profeſſors, &c. and after the Norman conqueſt, we find it had attained ſo much celebrity, that Henry I. was educated here; and, on account of his proficiency, obtained the name of Beauclerc, or the learned ſtudent.

Originally, as in the ſiſter Univerſity, the ſtudents hired Halls or Hotels for performing their exerciſes, and boarded with the townſmen. There is an ancient ſtructure of this kind ſtill remaining, called Pythagoras's School, ſituated Weſt of the river; and, though it is now uſed only as a barn, is the only relick of the old Univerſity. In proceſs of time Colleges were founded and endowed, and the method of ſtudy rendered more comfortable and eaſy. The firſt College appears to have been erected in the Reign of Henry III.

INTRODUCTION.

THE UNIVERSITY OF CAMBRIDGE is a ſociety of ſtudents, incorporated (13th Eliz.) by the name of the Chancellor, Maſters, and Scholars. This little Commonwealth conſiſts of ſixteen* Colleges or Societies, devoted to the ſtudy of learning and knowledge. All theſe †Colleges or Halls have been founded ſince the beginning of ‡Edward I. and are maintained by the endowments of their ſeveral Founders and Benefactors. Each College is a body corporate, and bound by its own Statutes; but is likewiſe controlled by the paramount laws of the Univerſity.

Each of the ſixteen Colleges furniſhes members both for the executive and legiſlative branch of its government. The place of aſſembly is the *Senate-Houſe.*

All perſons, who are Maſters of Arts, or Doctors in either of the three faculties, *viz.* Divinity, Civil Law, or Phyſic, have votes in this aſſembly. The number of thoſe who are entitled to the appellation of *Members of the Senate,* is at preſent about 940.

The Senate is divided into two Claſſes or Houſes; which are denominated *Regents* or *Non Regents.* Maſters of Arts, of leſs than five years ſtanding, and Doctors of leſs than two, compoſe the *Regent* or *Upper-Houſe,* or, as it is otherwiſe called, the *White Hood Houſe;* from its members wearing their Hoods lined with white ſilk. All the reſt conſtitute the *Non Regent,* or *Lower-Houſe,* otherwiſe called the *Black Hood Houſe;* its members wearing black ſilk Hoods. But Doctors of more than two years ſtanding, and the Public Orator of the Univerſity, may vote in either Houſe, according to their pleaſure.

The executive branch of the Univerſity is committed to certain Magiſtrates and Officers, all choſen by the Senate. They are in the following order:

A Chancellor, who is the head of the whole Univerſity; and in him is placed the ſole authority of governing power within the precincts, excepting matters of *Felony.* He is choſen by the body of the Senate, and is generally one of the principal nobility. The office is biennial, or tenable for ſuch a length of time, beyond two years, as the tacit conſent of the Univerſity may chuſe to allow.

---

* Downing College, as being ſtill unfounded, is omitted.

† Colleges and Halls are here (unlike thoſe at Oxford,) ſynonimous; the Halls enjoying in every reſpect the ſame privileges as the Colleges.

‡ The firſt authentic charter is ſaid to be dated 15. Hen. III. and to be found among the records in the Tower.

A **High Steward**, who has a ſpecial power to take the trial of ſcholars impeached of *Felony* within the *limits of the Univerſity. He is allowed a deputy. A **Vice Chancellor**, who is always the head of ſome College or Hall, and is choſen annually, on the 4th of *November*, by the body of the Senate. His office, in the abſence of the Chancellor, embraces the execution of the Chancellor's powers and government of the Univerſity; and, during his continuance in office, he acts as a magiſtrate for the Univerſity and County.—†**The Caput**, which is annually choſen on the 12th of October, and conſiſts of the Vice-Chancellor, a Doctor in each faculty, and two Maſters of Arts, repreſentatives of the *Regent* and *Non Regent Houſes*.—Two **Proctors**, who are Peace Officers, and elected by the *Regents* annually on the 10th of November, They attend to the diſcipline and behaviour of the Students, ſearch houſes of ill-fame, and commit women of looſe and abandoned character; alſo, attend the congregations of the Senate, &c. &c. They muſt be Maſters of Arts. Two **Moderators**, nominated by the Proctors, and appointed by a grace of the Senate; who ſuperintend the Exerciſes and Diſputations in Philoſophy, and the Examinations for the degree of Bachelor of Arts. Two **Taxors**, who are choſen the ſame as the Proctors. They are appointed to regulate the markets, examine the aſſize of bread, and the lawfulneſs of all weights and meaſures, Two **Scrutators**, who are *Non Regents*, and whoſe duty is to attend at all congregations, to read the graces in the *lower* houſe, to gather the votes, &c. A **Public Orator**, who is the voice of the Senate upon all public occaſions, writes, reads, and records the letters to and from the Senate. and preſents to all *honorary* degrees with an appropriate ſpeech. This is eſteemed one of the moſt honourable offices in the gift of the Univerſity. A **Commissary**, who is an officer under the Chancellor, an aſſiſtant or aſſeſſor to the Vice-Chancellor in his court. He alſo holds a court of record for all privileged perſons and ſcholars under the degree of A. M. He is appointed by the Chancellor's letters patent. A **Registrar**—**Three Esquire Bedells**, whoſe office is to attend the Vice-Chancellor upon all public occaſions, whom they precede with their *ſilver* maces—Two **Librarians**, to whom the regulations and management of the Public Library is confided.

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* The juriſdiction of the Univerſity is a mile every way round, from any part of the ſuburbs.

† Every Univerſity Grace muſt paſs the Caput before it can be admitted into the Senate.

Beſides theſe, there are a number of inferior officers, who are appointed by the Vice-Chancellor, for the time being, and hold their offices for life; ſuch as *School-keeper, Marſhall, Bell-ringer, Yeoman Bedell*, &c.

There are two Courts of Law in this Univerſity, *viz.* the *Conſiſtory Court of the Chancellor*, and the *Conſiſtory Court of the Commiſſary*.

The Two Members, which the Univerſity ſends to Parliament, are choſen by the body of the Senate. The University Council, are appointed by a Grace of the Senate, and are conſulted upon various occaſions. The Solicitor, is appointed by the Vice-Chancellor. The Syndics, are members of the Senate, choſen to ſuperintend the Buildings, Library, Printing, &c. The Professors of the different ſciences have ſtipends allowed from various ſources; ſome from the Univerſity cheſt, others from Government, or eſtates left for that purpoſe.

The Terms of this Univerſity are three; *viz. October*, or *Michaelmas* Term, begins on the 10th of October, and ends on the 16th of December. *Lent* or *January* Term, begins January the 13th; and ends on the Friday before Palm Sunday. *Eaſter*, or *Midſummer* Term, begins on the Wedneſday ſe'nnight after Eaſter day, and ends on the Friday after Commencement day. Commencement Day is always the firſt Tueſday in July.

When a Member of the Senate dies within the Univerſity, during term, the Univerſity Bell rings an hour; from which period *Non-term* commences for three days.

The ſeveral orders in the different colleges are as follow:

1. A Master, or Head, who is generally a Doctor of Divinity; excepting *Trinity-Hall*, where he is a Doctor of Laws; and *Caius*, where he may be a Doctor of Phyſic. The Head of *Kings* is ſtiled *Provoſt*; of *Queens*, *Preſident*.

2. Fellows, who generally are Bachelors of Divinity, Maſters or Bachelors of Arts; ſome few are Bachelors of Law and Phyſic, as at *Trinity-Hall* and *Caius*; or Doctors of Law and Phyſic.

3. Noblemen, Graduates, Doctors in the ſeveral Faculties, Bachelors of Divinity, (who have been A. M.) and Masters of Arts, are all Members of the Senate.

4. Graduates, who are not members of the Senate, are Bachelors of Divinity, denominated *Four-and-twenty-men*, or *Ten-year-men*.

5. Bachelors of Law and Physic.

6. Bachelors of Arts. Some of theſe are called *Bache-*

lor Commoners, and are ſuch as have been, while Under-graduates, *Fellow Commoners*.

7. FELLOW COMMONERS, who are generally the younger ſons of the Nobility, or young men of fortune, and have the privilege of dining at the Fellows' table, from whence the appellation poſſibly originated. They are diſtinguiſhed from the *Penſioners* and *Scholars* by their dreſs, which is ornamented with *Gold* or *Silver*.

8. PENSIONERS and SCHOLARS are nearly of the ſame order; except that the latter, from the enjoyment of ſcholarſhips, read the *graces* in Hall, *leſſons* in Chapel, &c.

9. SIZARS are generally men of inferior fortune, though frequently by their merit they ſucceed to the higheſt honors in the Univerſity. Moſt of our church DIGNITARIES have been of this order.

The limits of this work will not allow us to give an account of the ceremonies, &c. of taking degrees, we ſhall therefore merely add ſome particulars concerning them. The Students are admitted to the different degrees according to their ſtanding. The time required by the Univerſity ſtatutes for ſtudying, before they can be qualified for taking the ſeveral degrees, is as follows:—

A Bachelor of Arts, muſt reſide the greater part of twelve terms, the firſt and laſt excepted; there are invariably three terms in a year, therefore he muſt be a member four years. A Maſter of Arts, muſt have been a Bachelor of three years, ſtanding; though not obliged to reſide conſtantly during term as the former. A Bachelor of Divinity, muſt be a Maſter of Arts of ſeven years ſtanding. A Doctor of Divinity, muſt be a Bachelor of Divinity of five, or A. M. of twelve years ſtanding. A Bachelor of Laws, muſt be of ſix years ſtanding complete, and muſt keep the greater part of nine terms. A Doctor of Laws, muſt be a Bachelor of Laws of five years ſtanding, or a Maſter of Arts of ſeven years ſtanding. A Bachelor of Phyſic muſt keep the greater part of nine terms, and may be admitted any time in his ſixth year. A Doctor of Phyſic the ſame as L. L. D. A Bachelor of Muſic muſt enter his name at ſome college, and compoſe a ſolemn piece of muſic, as an exerciſe, prior to his degree. A Doctor of Muſic is generally Mus. B, and his exerciſe is the ſame. Noblemen, or ſuch as are entitled to *honorary* degrees, at two years ſtanding, are as follow:—1. Privy Counſellors. 2. Biſhops. 3. Noblemen, *viz*. Dukes, Marquiſes, Earls, Viſcounts, Barons. 4. Sons of Noblemen, 5. Perſons related to the King's Majeſty by conſanguinity or affinity: provided they be alſo honorable. 6. The eldeſt Sons of ſuch perſons, and Baronets and Knights, to the degree of A. M. only.

The time for conferring the degrees of Maſters of Arts, and Doctors of the ſeveral faculties, is at Commencement, which is always the firſt Tueſday in July. A Bachelor of Divinity takes his degree on the eleventh of June. The examination for the degree of Bachelor of Arts generally begins on the firſt Monday in Lent-term, and continues that, and the three following days; and on the Friday following they are admitted to their degrees. The number of Students who take their degrees at that time, is uſually about *a hundred.*

UNIVERSITY AND COLLEGE PRIZES.

The *annual* amount of Prizes for the encouragement of literature, free and open competition for the whole Univerſity, amounts to 353l. 5s. *viz.* Mathematics 50l. Claſſics and Engliſh Compoſition 303l. 5s.

The *annual* Prizes in the individual Colleges, about 286l. two thirds of which are allowed for the encouragement of Claſſical Literature.

CHANCELLOR's PRIZES.

Two gold medals, value 15 guineas each, are given annually by the *Chancellor* of this Univerſity, to two commencing Bachelors of Arts, who having obtained *Senior Optimes;* acquit themſelves the beſt in claſſical learning. The ſubject is appointed by the Vice-Chancellor; who, together with the Provoſt of King's, the maſters of Trinity, St. John's, Chriſt's, Clare-Hall, Peter-Houſe, and the ſenior Fellow of Trinity, elected from Weſtminſter ſchool, examines the candidates, and adjudges the Prizes. When there is an equality of votes the V. C. decides.

MEMBERS' PRIZES.

The *Repreſentatives* in Parliament of this Univerſity give four annual Prizes, of 15 guineas each, which are adjudged by the Vice-Chancellor and *heads* of colleges, to two ſenior and two middle Bachelors of Arts, who ſhall compoſe the beſt Diſſertations in Latin Proſe; which are read publicly on a day appointed near to the Commencement.

SIR WILLIAM BROWNE's PRIZES.

Sir William Browne, Knt. directed three gold medals, value 5 guineas each, to be given yearly to three Undergraduates on the Commencement day. The firſt to him that writes the beſt Greek Ode, in imitation of Sappho; the ſecond for the beſt Latin Ode in imitation of Horace; the third for the beſt

Greek and Latin Epigrams, the former after the manner of Anthologia, the latter after the model of Martial. The ſubjects are appointed by the Vice-Chancellor, the ſole adjudicator of this Prize.

SEATONIAN PRIZE.

Mr. Seaton bequeathed to the Univerſity, the rents of his Kiſlingbury eſtate, now producing clear 40l. *per annum*, to be given yearly to that Maſter of Arts who ſhall write the beſt *Engliſh* Poem upon a ſacred ſubject. The Vice-Chancellor, the Maſter of Clare-Hall, and the Greek Profeſſor determine the ſubject. The Poem is printed, and the expence deducted out of the product of the eſtate. The remainder is given as a reward to the compoſer.

NORRISIAN PRIZE.

John Norris, Eſq. of Wilton, in Norfolk, by will bequeathed a premium of 12l. *per ann.* 7l. 4s. of which is to be expended upon a gold medal, the reſidue in books, to the author of the beſt Proſe Eſſay on a ſacred ſubject, which is to be propoſed by the Norriſian Profeſſor. The candidate muſt be above 20 years of age, and under 30; and muſt have attended 20 of the Norriſian lectures in the courſe of ſome one year. The Prize is adjudged by the Maſter of Trinity, the Provoſt of King's, and the Maſter of Caius; and the Eſſay muſt be publiſhed within two months by the author; in default of which he forfeits the 12l.

SMITH's PRIZES.

Dr. Smith, late Maſter of Trinity college, left two *annual* Prizes of 25l. each, to two commencing Bachelors of Arts, the beſt proficients in Mathematics and Natural Philoſophy.—The adjudicators are the Vice-Chancellor, the Maſter of Trinity, the Lucaſian, Plumian, and Lowndian Profeſſors.

HULSEAN PRIZE.

The late Rev. John Hulſe, A. B. formerly of St. John's college, bequeathed to the Univerſity certain eſtates for the advancement of *religious* learning; and directed in his will, that out of the rents, an *annual* premium of 40l. ſhould be given to any member of this Univerſity, under the degree of A. M. who compoſed the beſt Diſſertation in the Engliſh language on the Evidences, &c. of the Chriſtian Religion. The Vice-Chancellor, and the Maſters of Trinity, and St. John's adjudge the Prize.

Note.—There are ſome other bequeſts contained in the ſaid will, for the promotion of religious knowledge, which are *now* under conſideration.

CRAVEN's SCHOLARSHIPS.

Lord Craven founded two Claſſical Scholarſhips, of 25l. *per ann.* each. Electors, the Vice-Chancellor, the five *Regii* Profeſſors, and the Public Orator.

BROWNE's SCHOLARSHIP.

Sir William Browne, Knt. left a perpetual rent-charge of 21l. *per ann.* upon ſundry eſtates, for founding a Scholarſhip; which, with all the arrears that may happen by vacancy, is tenable for ſeven years; but the poſſeſſor, if of another college, is obliged to remove to Peter-Houſe. Electors. the ſame as to Lord Craven's.

BATTIES SCHOLARSHIP.

William Battie, M. D. left an eſtate of 30l. *per ann.* on a plan ſimilar to the preceding. The Electors, are the Vice-Chancellor, the Provoſt of King's, the Profeſſors of Law, Phyſic, and Divinity, and the Proctors for the time being.

WORTS's BENEFACTION.

William Worts, formerly Eſquire Bedell, gave two penſions of 100l. *per annum* each, to two travelling Bachelors of Arts.

CYCLE

For the nomination of *Proctors; or a liſt of the Colleges, out of which the two Proctors are choſen annually, from the preſent year to the year 1837.

Years.	*Colleges.*	*Years.*	*Colleges.*
1803	Trinity & Jeſus	1821	King's & Clare Hall
1804	St. John's & Clare Hall	1822	Trinity & Bene't
1805	Queen's & Sidney	1823	St. John's & Magdalen
1806	Caius & Emanuel	1824	Pembroke & Jeſus
1807	King's & Cath. Hall	1825	Queen's & Sidney
1808	Trinity & Peter Houſe	1826	King's & Emanuel
1809	St. John's & Chriſt's	1827	Trinity & Caius
1810	Pembroke & Bene't	1828	St. John's & Peter H.
1811	Queen's & Clare Hall	1829	Chriſt's & Clare Hall
1812	King's & Magdalen	1830	King's & Bene't
1813	Trinity & Jeſus	1831	Trinity & Pembroke
1814	St. John's & Peter H.	1832	St. John's & Jeſus
1815	Chriſt's & Sidney	1833	Queen's & Magdalen
1816	Caius & Emanuel	1834	Peter H. & Cath. Hall
1817	King's & Pembroke	1835	King's & Sidney
1818	Trinity & Cath. Hall	1836	Trinity & Emanuel
1819	St. John's & Queen's	1837	St. John's & Chriſt's.
1820	Chriſt's & Peter Houſe		

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* If the office becomes vacant before the expiration of the year, Trinity-Hall preſents one for the remainder.

STATEMENT OF THE UNIVERSITY.

This ſtatement of the number of members of the ſeveral colleges was taken in 1802, and includes the *Non-Reſidents.*

Peter Houſe	—	69	Catherine Hall	—	28
Clare Hall	—	76	Jeſus	—	102
Pembroke Hall	—	80	Chriſt's	—	101
Caius	—	104	St. John's	—	465
Trinity Hall	—	82	Magdalen	—	61
Bene't	—	52	Trinity	—	548
King's	—	94	Emanuel	—	144
Queen's	—	88	Sidney.	—	53

TOTAL 2147.

The number of Members *reſident* in the Univerſity, during Term, is generally about a Thouſand.

Beſides theſe, there are a great number of inferior officers and ſervants, who are maintained on the foundation; their number is about 230.

UNIVERSITY CEREMONIES;

OR,

Such days as are more eſpecially obſerved by the Univerſity.

January

12. Margaret's Profeſſor (or ſome one appointed by him) preaches *ad Clerum*, at St. Mary's.

13. Lent Term begins.

30. King Charles's Martyrdom. Litany Day. Speech in the Senate Houſe. The V. C. appoints the Orator, who receives 5 guineas.

March

25. Lady-day. A Sermon at King's Chapel in the morning, and at St. Mary's in the evening.

On the *fourth* Sunday in Lent the Univerſity Sermon is preached at *Burwell*.

April.—On Good-Friday, and other public Faſt days, no organ is played, nor Pſalms ſung at St. Mary's.

Eaſter Day, no morning ſervice at St. Mary's. Anthem in the evening.

Eaſter Tueſday, the Univerſity Sermon is preached at Bene't Church.

May

8. The Regius Profeſſor of Divinity preaches *ad Clerum*, at St. Mary's.

29 King Charles's reſt. A Sermon at St. Mary's by a D. D. Anthem, Litany, and Scarlet-day.

June

11. Barnaby Lecturers appointed. B. D. commence their degrees.

23. Midſummer Fair proclaimed.

July.—On the Thurſday before Commencement-Sunday a Sermon is preached at St. Mary's, for the benefit of Addenbrooke's Hoſpital,

Commencement-day is always the firſt Tueſday in July. Maſters of Arts' and Doctors' degrees.

September

4. Stirbitch Fair laid out.

18. Stirbitch Fair proclaimed.

29. The Mayor ſworn in by the Vice-Chancellor.

October

9. Regius Profeſſor of Divinity preaches *ad Clerum*.

10. Michaelmas Term begins. Proctors and Taxors elected.

12. Election of the Caput.

November

3. The Vice-Chancellor reſigns his office
Nomination of Vice-Chancellor.

4. Election of Vice-Chancellor: The ſenior Proctor makes a ſpeech.

5. Gunpowder Plot. Sermon by one of the *Heads*. Anthem and Litany-Day, Speech in the Senate-houſe by an A. M.

December

16. Michaelmas Term ends. On the day after each Term is a Matriculation.

25. Chriſtmas Day. No Sermon in the morning at St. Mary's. Anthem in the evening. Scarlet-Day.

The following are *SCARLET-DAYS*, when the Doctors, &c. wear their robes :

Eaſter-Sunday, Aſcenſion-day, Whit. Sunday, Trinity-Sunday, King Charles's Reſtoration, King's Inauguration, the proclamations of Midſummer and Stirbitch Fairs, Commencement-Sunday and Tueſday, St. Michael, All Saints, Gunpowder Treaſon, Chriſtmas-day, and all general Thankſgiving days.

*LITANY DAYS.

January 30th. May 29th. King's Inauguration, Gunpowder Plot, Aſh-Wedneſday.

ANTHEM DAYS AT St. MARY's.

Eaſter-Sunday, Whit-Sunday, King Charles's Reſtoration, King's Inauguration, Commencement-Sunday, November 5, Chriſtmas-day, and general Thankſgiving-days.

The Commemoration of Benefactors is read, after the Sermon at St. Mary's, on Commencement-Sunday and the Sunday next before November 3.

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* All Litany Days the Doctors and Noblemen wear their Robes, and the Proctors their Congregation Ruffs.

UNIVERSITY OFFICERS, 1804.

		Elected.
Chancellor,	His Grace Auguſtus Henry, Duke of Grafton, K. G. Pet.	1768
High Steward,	Right Honourable William Pitt, A. M. F. R. S. Pemb.	1790
Members of Parliament,	Rt. Hon. Geo. Hen. Fitzroy, Earl of Euſton, A. M. Trin. Rt. H. W. Pitt, A. M. F. R. S. Pem.	1784
Vice Chancellor,	Martin Davy, M.D. F. R. S. Maſter of Caius.	1803
Commiſſary,	John Fiſher, L. L.D. Chriſt's.	1790

Colleges and Halls.	HEADS.		
Peter Houſe,	Francis Barnes, D. D.	*Maſter,*	1788
Clare Hall,	John Torkington, D. D.	*Maſter,*	1781
Pembroke Hall,	Joſeph Turner, D. D.	*Maſter,*	1784
Bene't,	Philip Douglas, D. D.	*Maſter,*	1795
Trinity Hall,	Sir W. Wynne, Knt. L. L. D.	*Maſter,*	1803
Caius	Martin Davy, M. D. F. R. S,	*Maſter,*	1803
King's,	Humphrey Sumner, D. D.	*Provoſt,*	1797
Queen's	Iſaac Milner, D. D. F. R. S.	*Preſident,*	1788
Cath. Hall,	Joſeph Procter, D. D.	*Maſter.*	1799
Jeſus,	William Pearce, D. D. F. R. S.	*Maſter,*	1789
Chriſt's,	John Barker, D. D.	*Maſter,*	1781
St. John's,	William Craven, D. D.	*Maſter,*	1789
Magdalen,	William Gretton, D, D.	*Maſter,*	1797
Trinity,	William Lort Manſel, D. D.	*Maſter,*	1798
Emanuel,	R. Towerſon Cory, D. D.	*Maſter,*	1797
Sidney,	William Elliſton, D. D.	*Maſter,*	1760

Caput,	The Vice-Chancellor, Joſeph Procter, D. D. *Cath. Hall, Divinity.* Joſeph Jowett, L.L.D, Trin. Hall, *Law.* Sir Iſaac Pennington, M. D. St. John's, *Phyſic.* John Hopkins, A. M. Chriſt's, *Sen. Non. Regent.* Jeremiah Day, A. M. Caius, *Sen. Regent.*	1803

		Elected.
Proctors,	John Hen. Renouard, A. M. Trin.	1803
	Thomas Caſtley, A. M. Jeſus.	
Moderators,	John Hudſon, A. M. Trin.	1803
	Robert Woodhouſe, A. M. Caius.	
Taxers,	Thomas Sumpter, A. M. King's	1803
	Samuel Lowe, A. M. Magdalen,	
Scrutators,	Thomas Browne, B. D. Chriſt's	1803
	Clement Chevalier, A. M. Pemb.	
Public Orator,	Edmund Outram, B. D. St. John's	1798
Council,	Hugh Leyceſter, L.L.D. King's	1799
	Hon. Spencer Perceval, A. M. Trin.	1800
Librarians,	John Davies, B.D. Vice-Maſter, of Trin.	1783
	Thomas Kerrich, A. M. Magdalen	1797
Regiſtrar,	George Borlaſe, B. D. Pet.	1778
Eſquire Bedells,	John Beverley, A. M. Chriſt's	1770
	Henry Gunning, A. M. Do.	1789
	Charles Iſola, A. M. Eman.	1797

Solicitor, John Ingle.

Marſhall, John Taylor. *Yeoman Bedell,* John Laughton.
School Keeper, John Marſhall. *Printer,* Richard Watts.
Bell Ringer, John Marſhall. *Deputy,* Philip Moore.
Organiſt, John Pratt. *Clerk,* Thomas Steers.
Wardens of the Market, John Taylor, John Aſhby.
Guager, William James.
Appraiſers. John Smith, Thomas Yorke.
Curator of the Botanic Garden, James Donn, A. L. S.

PROFESSORS.

(Thoſe Profeſſors who uſually give lectures during Term, are marked thus * .)

Founders.		*Elected.*
	DIVINITY.	
	£1000. per annum.	
Lady Margaret Anno. 1502.	John Mainwaring, B. D. St. John's	1788
	* REGIUS PROFESSOR OF DIVINITY.	
	£1000. per annum.	
Henry 8th. 1540.	Rt. Rev. R. Watſon, D. D. F. R. S. Trinity.	1771
	DEPUTY.	
	£200. per annum.	
———	John Barlow Seale, D.D.F.R.S.Chriſt's	1802
	CIVIL LAW.	
	£40. per annum.†	
Henry 8th. 1540.	Joſeph Jowett,* L.D.D. Trin.Hall.	1781
	PHYSIC.	
	£40. per annum.†	
Henry 8th. 1540.	Sir Iſaac Pennington, Knt. M. D.	1793

* To this Profeſſorſhip the valuable Living of Somersham, Hunts, is annexed.

† This ſtatement merely includes the allowance from Government.

Founders.		*Elected.*
	HEBREW.	
	£40. per annum.†	
Henry 8th. 1540.	Henry Lloyd, A. M. Trin.	1795
	GREEK.	
	£40. per annum.†	
Henry 8th. 1540.	Richard Porſon, A. M. Trin.	1792
	CASUISTRY.	
	£70. per annum.	
Knightbridge. D. D. 1683.	George Borlaſe, B. D. Pet.	1788
	ARABIC.	
	£40. per annum.	
Sir I. T. Adams, Bart. 1632.	Jos. Dacre Carlyle, B. D. Queen's	1795
	MATHEMATICS.	
	£350. per annum.	
Lucas, Eſq. 1663.	Iſaac Milner, D. D. F. R. S. President of Queen's.	1798
	EXPERIMENTAL PHILOSOPHY.	
	£250. per annum.	
Plume, D. D. 1704.	Samuel Vince,* A. M. F. R. S. Caius.	1796
	CHEMISTRY.	
	£100. per annum.†	
Univerſity. 1713.	William Fariſh,* A. M. Mag.	1794

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† This ſtatement merely includes the allowance from Government.

BOTANY.

£200. per annum.†

Founders.		Elected.
Univerſity. 1724.	T. Martyn,* B. D. F. R. & L. S. Sid.	1761

ANATOMY.

£100. per annum.†

Univerſity. 1707.	B. Harwood,* M. D. F. R. & A. S. Eml.	1785

MODERN HISTORY AND LANGUAGES.

£400. per annum.†

George 1ſt. 1724.	John Symonds,* L. L. D. Trin.	1771

MINERALOGY.

£100. per annum.

Woodward, M.D. 1727.	John Hailſtone, A. M. F. R. and L. S. Fellow of Trinity,	1788

INSPECTORS OF FOSSILS.

£5, each.

———	Richard Wood, A. M. Cath. Hall. John Palmer, A. M. St. John's.	1802

ASTRONOMY.

£300. per annum.

Loundes, Eſq. 1749.	William Lax, A. M. F. R. S. Trin.	1795

NORRISIAN PROFESSOR OF DIVINITY.

£100. per annum.

Norris, Eſq. 1768.	James Fawcett,* B. D. St. John's.	1795

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† This ſtatement merely includes the allowance from Government.

Founders.		*Elected.*

LADY MARGARET's PREACHER.

£10. per annum.

1504.	James Fawcett, B. D. St. John's.	1786

NATURAL AND EXPERIMENTAL PHILOSOPHY.

£160. per annum.

Jackſon, Eſq. 1783.	F. John Hyde Wollaſton,* B. D. F. R. S. Trin. Hall.	1792

LAWS OF ENGLAND.

£100. per annum.†

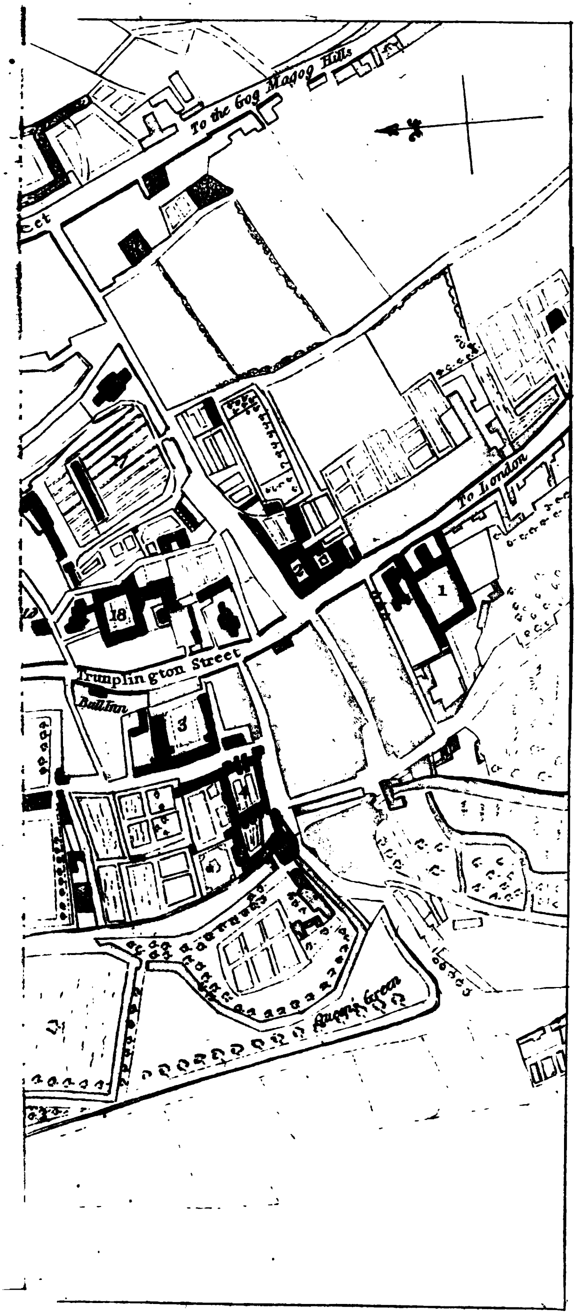
Univerſity. 1788.	Edward Chriſtian,* A. M. St. John's.	1788

MUSIC.‡

———	Charles Hague, D. Mus.	1799

† This ſtatement merely includes the allowance from Government.

‡ The firſt Profeſſor was appointed by Grace, July 2, 1684.


To the Gog Magog Hills
eet
To London
18
1
Trumplington Street
Bull Inn
3
Queen's Green

THE NEW

CAMBRIDGE GUIDE,

&c. &c.

HAVING endeavoured to give as comprehenſive an account of the *Univerſity Cuſtoms, &c.* as the limits of our work would allow, we now proceed to deſcribe the Public Buildings, Colleges, &c. beginning with thoſe belonging to the Univerſity in general, and proceeding to the ſeveral colleges, in the order of their foundation, and ſhall conclude our little tract with a conciſe and accurate account of the Town and County of Cambridge; and with a liſt of articles of *univerſal utility*, as well to thoſe reſident in the place, as to ſtrangers who pay it a curſory viſit.

As the colleges are arranged in the order of their *foundation*, and not of their *ſituation*, it may be neceſſary to premiſe that the whole may be ſeen in one walk, without unneceſſary loſs of time, by beginning at the Senate-Houſe, Library, St. Mary's Church, &c. and thence proceeding to the colleges neareſt; to which a ſtranger may be guided by the PLAN at the beginning of the book. Thoſe ſtrangers who would view the different objects with the *greateſt deſpatch*, are recommended to take with them a ſervant from the Inn; who will not only be uſeful in leading the way, but alſo in ſeeking the perſon who is to ſhew the next place, while the company are viewing a former one.

THE SENATE-HOUSE

Is, both on account of its importance and its ſituation, the firſt object that claims our attention. It is ſituated about the middle of Trumpington-ſtreet, and forms the north ſide of an intended ſquare; three ſides being all that are yet completed. The weſt ſide conſiſts of the Public Library and Schools; and on the eaſt ſide is St. Mary's Church, which is ſeparated from the ſquare by the ſtreet, and an iron railing on a dwarf ſtone wall; and on the ſouth of this noble quadrangle, immediately oppoſite the Senate-Houſe, it is intended to erect a building exactly correſponding with it, which is to contain the Conſiſtory, Regiſtrar's Office, &c. The Senate-Houſe, which is a ſuperb ſtructure, was built by James Gibbs, the architect of the new building of King's College, and was begun June 22, 1722. It is an elegant building of Portland ſtone, of the Corinthian order, ornamented with a range of pilaſters ſupporting the entablature, &c. between two rows of ſaſh windows, and an elegant ſtone baluſtrade ſurrounding the ſummit. In the middle of the grand front, next the ſquare, is a magnificent triangular pediment, ſupported by four fluted Corinthian columns, the capitals of which are finely carved; under this pediment is an entrance aſcended by a flight of ſteps, though it is not uſed as ſuch, the uſual entrance being at the eaſt end, where is another pediment ſupported by columns and correſponding with the one on the ſouth. On entering this ſuperb edifice, one is ſtruck with the effect it produces: its dimenſions are (within ſide) 101 feet long, 42 broad, and 32 high; and on the firſt view its proportions are ſtrikingly juſt; it is elegantly ornamented with wainſcots, carvings, and galleries of Norway Oak, which has greatly the appearance of mahogany. The gallery at the eaſt end, over the entrance, is ſupported by four fluted Doric columns of the ſame beautiful wood; and at the upper end are four ſimilar columns ſupporting a triangular pediment, beautifully carved; under which, and raiſed on ſteps, is the Vice-Chancellor's chair; on each ſide of which are circular ſeats for the Heads, Noblemen, and Doctors; beyond theſe ſit the *Regents*, or *White Hoods*; and below them the *Non Regents* or *Black Hoods*. In the corner, on the right hand of the chair, is a ſmall robing room for the Doctors, and on the left a private ſtaircaſe to aſcend the gallery. On each ſide the entrance is a ſimilar ſtaircaſe leading alſo to the gallery; into which, ladies and gentlemen are admitted when degrees are conferred, and on all public occaſions. This gallery is ſuppoſed capable of containing 1,100 perſons. The ceiling is beautifully and richly ornamented with Stucco work, executed with much taſte; and the floor is of black and white marble in alternate ſquares.

In the middle of the apartment, on the north ſide, is a fine ſtatue of King George I. by Ryſbrack: it was erected at the expence of Lord Viſcount Townſhend, who dying before it was finiſhed, it was completed by his ſon. On the pedeſtal are inſcriptions to that effect. Oppoſite this, on the ſouth ſide, is a ſtatue of King George II. by Wilton, which has the following lines on the baſe of the pedeſtal:

GEORGIO Secundo
Patrono ſuo, optime merenti,
Semper Venerando;
Quod volenti Populo,
Juſtiſſime humaniſſime,
In Pace et in Bello
Feliciter imperavit;
Quod Academiam Cantabrigienſem
Fovit, auxit, ornavit;
Hanc Statuam,
Æternum, faxit Deus, Monumentum
Grati animi in Regem,

Pietatis in Patriam,
Amoris in Academiam,
Suis Sumptibus, poni curavit,
Thomas Holles,
Dux de Newcaſtle,
Academiæ Cancellarius.
A. D, 1766.

"To George the Second, his moſt deſerving and moſt reſpected patron, for having governed a willing people, with the greateſt juſtice, humanity, and ſucceſs, both in Peace and War; for having cheriſhed, augmented, and adorned the Univerſity of Cambridge; this Statue (may it pleaſe God to let it ſtand as a perpetual monument of his gratitude to the King, of his dutiful affection to the Country, and of his love to the Univerſity;) was erected at the expence of Thomas Holles, Duke of Newcaſtle, and Chancellor of the Uuiverſity, in the year 1766."

At the eaſt end (on each ſide the entrance,) are two other Statues: the one on the ſouth ſide repreſents the late Duke of Somerſet, when young, dreſſed in the Vandyke taſte, with the enſigns of the order of the garter. It was executed by Ryſbrack, and is univerſally eſteemed a fine piece of ſculpture. The Duke is repreſented leaning on a pedeſtal, in a remarkably graceful and eaſy poſture, and holding out a roll in his right hand. The following inſcription is engraved in capitals on the front of the pedeſtal:

CAROLO
Duci Somerſetenſi
Strenuo juris Academici Defenſori
Acerrimo Libertatis Publicæ vindici
Statuam,
Lectiſſimarum Matronarum Munus
L. M. ponendam decrevit
Academia Cantabrigienſis
Quam Præſidio ſuo munivit
Auxit Munificentia
Per annos plus ſexaginta
Cancellarius.

“ To CHARLES, DUKE OF SOMERSET, a ſtrenuous defender of the rights of the Univerſity, a moſt ardent aſſertor of Public Liberty, THIS STATUE, the gift of two moſt excellent matrons, was erected with the utmoſt pleaſure by the Univerſity of Cambridge, which he, as CHANCELLOR, had protected by his patronage, and augmented by his munificence, during more than ſixty years.”

On the reverſe are the words:

Hanc Statuam
Suæ in Parentem pietatis
In Academiam ſtudii
Monumentum
Ornatiſſimæ Fœminæ
Franciſca Marchionis de Granby Conjux
Charlotte Baronis de Guernſey
S. P. faciendam curaverunt.
M. D. CC. LVI.

“ The moſt accompliſhed ladies, FRANCES, wife of the Marquis of Granby, and CHARLOTTE, Baroneſs of Guernſey, cauſed this ſtatue to be erected at their own expence, in the year 1756, as a monument of their filial duty to their parent, and their affection to the Univerſity.”

The Statue on the north ſide is an emblematical figure of GLORY, executed by Borotta, an Italian, and preſented to the Univerſity by Sir Peter Burrell: on the ſcroll are theſe words: *Cuncti Adſint, Meritæq. Expectent Præmia. Palmæ*:

“ Let all be preſent, and accept the palm, the reward of merit.”

On the front of the Pedestal is this inſcription:

Gloriæ. Æternæ
Almæ. Matris. Academiæ
Sacrum
Ob
Doctrinæ. Feliciter. Excultæ
Perpetuam. Laudem

Et
Excolendæ
Felicem. Operam
L. M. P.
Petrus. Burrell
In
Pietatis. Suæ. Et. Fidei
Publicum. Argumentum
M. D. CC. XL, VIII.

" This ſtatue, ſacred to the everlaſting glory of ALMA MATER, the Univerſity, was, in conſequence of the uninterrupted renown of LEARNING, happily cultivated, and the proſperous endeavour for its future improvement; joyfully erected by PETER BURRELL, as a public teſtimony of his love and friendship, in the year 1748."

The building of the Senate-Houſe, coſt near £20,000. about £11,000. being ſubſcriptions, King George I. gave £2,000. and King George II. £3,000. towards it; and a numerous liſt of ſmaller benefactions, from generous individuals, completed the ſum.

THE PUBLIC LIBRARY

Is ſituated on the weſt ſide of the quadrangle, and conſiſts of four rooms on the upper floor; the ground floor being occupied on three ſides by the Schools, and forming behind the ſquare a ſmall court. The new room, which is the only part that fronts the ſquare, was rebuilt in 1775, by Stephen Wright; it is an elegant building of ſtone, in a different ſtyle of architecture from the Senate-Houſe, with a ſpacious piazza in front, and ſurmounted with a handſome baluſtrade and urns. The entrance is from the cloiſter, which leads into the veſtibule; in which is recently placed an antique Coloſſal Statue of Ceres, brought from the Temple at Eleuſis, by Meſſrs. Clarke, and Cripps, of Jeſus College; and near is placed a claſſical relick particularly intereſting to the Univerſity, viz. the Cippus from the Tomb of Euclid. A number of antique marbles, inſcriptions, &c. brought from Greece, by the ſame Gentlemen, ſurround theſe valuable pieces of antiquity. The aſcent to the Library is by an elegant geometrical ſtaircaſe of ſtone. The firſt room is called the old Library, and conſiſts of eighteen claſſes. In this apartment is a copy of the *Magna Charta* on vellum, from the Cottonian Library; and an ancient painting of the Cycle of Proctors, Taxors, &c. for a ſeries of 50 years, with the arms of the reſpective Colleges. At the end of this room is a handſome ſquare apartment, ornamented with carved Oak, and fitted up with doors of gilt wire placed before the ſhelves; which are filled with a valuable collection of M. S. S. This apartment is lighted by an elegant dome and one large window. Here is a cabinet given by the Rev. Archdeacon Lewis, which contains ſome valuable Oriental Manuſcripts, and other curioſities: in the lower part is a curious Chineſe Pagod, made of boiled rice, which has the appearance and conſiſtence of marble; a ſheet of paper 4 yards long by 1. ½. wide; the jaw of a ſhark; tuſks of wild boars; &c. In the drawers are a book written on reed, ſuppoſed to be the ancient Papyrus, with a Stylus; a pack of Chineſe playing cards on tortoiſe-ſhell, conſiſting of ſix ſuits; two medals, of the King and Queen of Denmark; a Queen Anne's farthing; &c. In the upper part of the cabinet is a beautiful copy of the Koran, remarkable for the excellence of its writing and the paper made from cotton; alſo, a beautiful and ſplendid Perſian M. S. written in 1338, and entitled "*The wonders of the Creation*;" being a treatiſe on Aſtronomy and Natural Hiſtory. The leaves of this elegant manuſcript are of cotton paper, embelliſhed with drawings of beaſts, birds, reptiles, &c. many of which are finely executed, and the colouring is uncommonly brilliant; being as freſh as if lately finiſhed: the paintings are ornamented with gold intermixed with the moſt beautiful colours, amongſt which Ultramarine ſhines unrivalled; and the volume is bound in a remarkably rich and ſuperb binding. The volume coſt in Perſia £100. In the next room, on the right hand, are the firſt editions of the Greek and Latin claſſics, and a great part of the works of William Caxton, the firſt Printer in England; a valuable manuſcript of the Four Goſpels and the Acts of the Apoſtles, written on vellum in Greek and Latin Capitals; it was given to the Univerſity by Theodore Beza, and ſuppoſed to be one of the oldeſt manuſcripts extant. This claſs was alſo enriched by ſeveral valuable M. S, S. purchaſed at the ſale of Dr. Aſkew's collection. This apartment and the next (running over the ſchools, and forming the weſt and north ſides of the court,) contain twenty-ſix ſpacious claſſes, conſiſting of the Library given by George I. compriſing 30,000 volumes; which were the entire collection of the late Dr. Moore, Biſhop of Ely, and were purchaſed for 6000 guineas. His Majeſty, beſides this, gave £2000. towards fitting up theſe apartments. In this part of the Library are alſo a collection of coloured ſhells moſt admirably done, and allowed to be exquiſitely natural; an ancient Egyptian Mummy above 2000 years old; and a canopy of cloth of gold with the royal arms, &c. curiouſly embroidered on it, which was carried over Queen Elizabeth, when ſhe honoured the Univerſity with a viſit in 1556. The eaſt room, which fronts the ſquare, has been newly built in a very elegant manner, and is fitted up with much taſte; it contains commodious and handſome new claſſes, an elegant ſtuccoed ceiling, and uncommonly rich cornice of flowers and fruit. This room opens on the ſtaircaſe, from which we entered the Library.

In the north room of the Library, are the following paintings: Roger Gale, Eſq. by Sir Peter Lely; King Charles II, ſmall; Peter Gunning, Biſhop of Ely; John Moore, Biſhop of Ely; Lord Viſcount Townſhend; Queen Elizabeth; Prince Charles, ſon of James I. by D. Mytens; King Charles I. *a very fine one*, by Vandyke; Anthony Shepherd. late Profeſſor of Experimental Philoſophy, in his robes, ſitting with a book; and ſeveral others. On the ſtaircaſe: a plan of the city of Jeruſalem; a large painting repreſenting two proceſſions of the Univerſity, one for a Doctor of Divinity, and one for a Doctor of Laws' degree, &c. containing 74 figures in their proper dreſſes, *a very curious painting;* deſigns for the intended new building at Cambridge, by Mr. Soane; a deſign for a bath, by Mr. Humfrey; an excellent whole length, by Reinagle, of the late *John Nicholſon*, a well-known Bookſeller of Cambridge uſually called *Maps.*

His Majeſty George II. gave £3000. towards building the new Library.

THE SCHOOLS

Are on the ground floor, under the ſouth, north, and eaſt rooms of the Library, forming together a ſmall court. On the weſt ſide are the Philoſophy Schools where diſputations are held in term time by the *Sophs;* on the north the Divinity Schools; and on the ſouth the Law and Phyſic; where the candidates for degrees perform their exerciſes in the ſeveral faculties. At the north end of the Philoſophy School is a room where is depoſited Dr. Woodward's collection of foſſils, ores, minerals, ſhells, and other rarities; which are well worth the inſpection of the curious. On the eaſt, behind the piazza. is a handſome lecture-room, where ſeveral of the Profeſſors deliver their lectures during term.

THE BOTANIC GARDEN

Is ſituated at the eaſt end of the town, near Bene't College: it contains near five acres, and is well ſupplied with water by a canal in the middle. It belonged originally to the Auguſtine Friars, and was purchaſed, for its preſent uſe, by Dr. Walker, Vice-Maſter of Trinity College, for £1600. An elegant and commodious Green-houſe has been erected, chiefly by ſubſcription, which is above 100 feet long, and furniſhed with a great variety of curious and valuable exotics; which have been greatly augmented and improved within theſe few years. Adjoining is a Hot-houſe, furniſhed with ſtoves for preſerving exotics, on the moſt improved conſtruction. Among the exotics are a variety of ſingular trees and plants from New-Holland; ſome tea, coffee, and bread-fruit trees; a cotton-tree, and many others of equal curioſity and value.— The whole garden is arranged according to the ſyſtem of Linnæus.* This garden is under the government of the Vice-Chancellor, the heads of King's, Trinity, and St, John's Colleges, and the Regius Profeſſor of Phyſic; and is ſuperintended by a lecturer and curator. A large and handſome building has been erected in the garden for the Botanical and Chemical lectures; which is peculiarly convenient for the purpoſe, and furniſhed with a large collection of natural curioſities well deſerving a ſtrangers attention,

For a deſcription of ST, MARY's CHURCH, and ADDENBROOKE's HOSPITAL, ſee the Hiſtory of the Town, &c.

St. PETER's COLLEGE,

Originally conſiſted of two Hotels, which were purchaſed by Hugh de Balſam, Sub-Prior of Ely, and by him, appropriated, in the year 1257, to the uſe of the ſtudents; and in the year 1284. after he became Biſhop of Ely, he endowed this college for the ſupport of a Maſter, fourteen Fellows, and eight Scholars. There are three colleges at Oxford which diſpute the point of antiquity with this houſe: and an opinion has been advanced that St. John's College is the moſt ancient foundation.—See St. John's College. St. Peter's College derived its name fiom its vicinity to the church of St. Peter: on the ſite of which the church of St. Mary the leſs now ſtands; it is uſually called Peter-Houſe.

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* A catalogue of the plants is published, and may be had of the Curator, at his houſe, at the entrance of the garden.

It is ſituated on the weſt ſide of Trumpington-ſtreet, near the ſouth entrance of the town; and conſiſts of two courts, ſeparated from each other by a cloiſter and gallery. The ſmalleſt court, which is next the ſtreet, has the Library on ſouth, and a handſome lofty ſtone building on the north, which contains ſix grand apartments, the upper ones command a pleaſant and extenſive proſpect. In the middle of this court ſtands the Chapel. The large court, weſt of the cloiſter, is about 145 feet long, and 85 broad; it has been elegantly caſed with ſtone, and ſaſhed in the modern ſtyle, and now forms a regular and handſome ſquare, containing ſeveral commodious apartments.

THE CHAPEL is a very handſome ſtructure with embraſures and pinnacles; it is very neatly decorated within, and is about 55 feet long, 27 broad, and as many high. At the weſt end is a gallery, in which is a neat Organ, given by Sir Horatio Mann; and the Altar-piece is a beautiful one of Norway Oak, over which is a very fine window of painted glaſs, repreſenting the *Crucifixion*, the figures are nearly as large as life, and it is, in ſome parts, very richly coloured. The principal figures are copied from the famous picture of Rubens on the ſame ſubject, at Antwerp: the groups at the ſides are ſaid to be from a deſign by L. Lombard.

THE LIBRARY, though not remarkable either for its extent or beauty, contains ſome ancient and valuable books.

THE HALL is a handſome room, 48 feet long, and 24 broad, and has ſeveral pictures; amongſt which is a portrait of the founder, Hugh de Balſam.

The Master's Lodge is oppoſite the college, on the eaſt ſide of the ſtreet; it is a large modern building of brick and ſtone, containing many convenient and well-furniſhed rooms, and ſurrounded with a pleaſant garden. South of the college is a pleaſant retired grove; and beyond an extenſive garden, well planted with fruit trees, &c. and containing a cold bath.

Among the eminent characters who have have been educated at this college are: The famous Cardinal Beaufort, Biſhop of Wincheſter; John Whitgift, Archbiſhop of Canterbury; John Coſyns, Biſhop of Durham; the Duke of Grafton, Chancellor of the Univerſity; Roger Marſhall, an eminent Mathematician and Phyſician to Edward IV. George Joy, one of the Tranſlators of the Bible; Sir Samuel Garth, author of the *Diſpenſary*; and the Poet Gray.

This college conſiſts of a Maſter, fourteen Fellows on the foundation, eight bye Fellows, and forty-eight Scholarſhips. The whole number of Members in 1802 was 69. The Viſitor, is the Biſhop of Ely.

CLARE HALL.

Was founded by Richard Badew, or Badow, Chancellor of the Univerſity, in the year 1326; who purchaſed two tenements, on the ſite of which he built a college called Univerſity-hall. This edifice, ſixteen years after its erection, was deſtroyed by an accidental fire; Dr. Badew, then ſolicited the patronage of Elizabeth, third daughter and heireſs of Gilbert, laſt Earl of Clare. By her bounty the college was rebuilt in 1344; and endowed with lands for the maintenance of a Maſter, ten Fellows, and the ſame number of Scholars: and from thence it obtained the name of Clare Hall. Richard III. augmented the endowments; which have alſo been increaſed by the donations of Thomas Cecil, Earl of Exeter; John Freeman, Eſq. William Butler; and Samuel Blythe; beſides numerous ſmaller benefactions.

In Cambridge, as we have before remarked, there is no difference in any reſpect between a college and a hall; and Clare Hall is indeed one of the principal. It is delightfully ſituated on the eaſtern banks of the river Cam; and conſiſts of one ſpacious court (beſides the Chapel) which is entered, on the eaſt and weſt ſides, by two noble porticos, or, rather, lofty arched paſſages. This court is 150 feet long, and 111 broad, and is uniformly and handſomely built with ſtone; on the north ſide are the Library, Hall, and Combination-room; on the weſt, the Maſter's Lodge; and on the eaſt and ſouth ſides, are the apartments of the Fellows and Students, which are all modern, handſome, and convenient. The three fronts ſeen of this college are all elegant; but that next the walks and fields, is extremely magnificent; it is built with Ketton ſtone, and is ornamented with two ranges of pilaſters, the lower one of the Tuſcan, and the upper of the Ionic order, which includes two ſtories. Between theſe pilaſters are three rows of ſaſh-windows; the upper and lower ones being adorned with architraves, and the middle tier with pediments. This elegant front is finiſhed with a circular pediment, ornamented with urns, an entablature, and handſome baluſtrade; and has a fine and beautiful effect, when viewed from the fields.

THE CHAPEL is ſituated without the court, at the weſtern front of the college, in a ſmall court-yard incloſed with iron paliſades. This Chapel was erected, in 1703, from a claſſical and elegant design of Sir James Burroughs, and cost above £7000. building. The outside is ornamented with Corinthian pilasters, rising from a rustic baſe, and ſupporting a handſome cornice, crowned with a balustrade. The Anti-chapel is entered from the north-east corner of the court; it is an Octagon, lighted by an elegant dome, beautifully stuccoed and decorated. The interior of the Chapel is adorned with a very handſome ceiling of stucco-work, ſeats and wainſcotting of Norway Oak, neatly carved, and a floor of black and white marble.—Over the altar is a beautiful alcove, ornamented with fluted columns and carvings; in which, is a fine painting of the *Salutation*, by Cipriani. The communion-plate, belonging to this college, is of pure beaten gold. This Chapel is allowed, for chasteneſs of design and elegance of decoration, to excel any building of its kind in the University.

THE HALL is a large and very handſome room 69 feet long, 21 broad, and 25 high; it has a gallery at the west end, leading to the Combination-room; which is about 33 feet ſquare, elegantly wainſcotted with Oak, and fitted up in a ſuperior style. Here are portraits of Thomas Cecil, Earl of Exeter; Archbiſhop Tillotſon; Biſhop Moore; a whole length of the late Duke of Newcastle, Chancellor of the University; and a copy, by Freeman, of Lady Elizabeth Clare, the foundreſs.

THE LIBRARY opens into the Combination-room at one end, and the Master's Lodge at the other. It is nearly of the ſame dimensions as the former, and very elegantly fitted up and ornamented, with columns and carvings of Norway Oak. The books are extensive and well ſelected, and the room as complete, of its size, as any in the University.

THE MASTER'S LODGE, which fronts the fields, is anſwerable to the other buildings; commodious and handſome within, and elegant without. It has a pleaſant and tasteful garden at the front, with a large Green-houſe and a terrace-walk on the banks of the river. But the principal attractions of this college are its beautiful walks and lawn. The western portico of the court opens on a broad walk, bounded on each side by the Master's and Fellows' Gardens, and connected with a fine vista, planted with Limes, by an elegant stone bridge of three arches. At the extremity of the vista, through a noble pair of iron gates, is Clare-Hall-Piece; which, from its unrivalled attractions, has become the favorite promenade of the University and Town; and on a fine ſummer's evening is filled with well-dreſſed company. A more delightful ſpot can ſcarcely be imagined; it preſents to the view, on one side, the magnificent structures of Clare-Hall, King's Chapel, and the new building of King's, with a partial view of St. Mary's Church, Trinity-Hall, &c. and before them the winding stream of the Cam, groves, lawns, and gardens: while, on the other side, is a cultivated and rural landſcape, with a pleaſant and extensive proſpect; preſenting thus to the eye, an aſſemblage of the most interesting and beautiful works of art and nature. We ſhall take our leave of this college by obſerving, that, in every reſpect, it is as complete and charming as any college in the University.

Among the eminent writers who were instructed in this college are: Peter Gunning, Biſhop of Ely; John Tillotſon, the celebrated Archbiſhop of Canterbury; George Ruggle, author of *Ignoramus;* Abraham Whitlock, who tranſlated the New Testament into the Persian language; Ralph Cudworth, author of the *Intellectual Syſtem;* and the late unfortunate Dr. Dodd. Thomas Holles, Duke of Newcastle, and Chancellor of the University, was alſo of this college.

This college consists of a Master, ten ſenior, two middle, five junior, and three bye Fellows; besides Scholars and students. The whole number of members in 1802 was 76. Viſitor, the Chancellor.

PEMBROKE HALL,

Was founded, in the year 1343, by Mary, third wife of Audomer de Valencia, Earl of Pembroke; who was killed at a tilting match on his wedding-day. This accident induced his virgin widow to renounce the world, and devote her large poſſeſſions to acts of benevolence. In purſuance of this design, ſhe obtained a charter of incorporation from Edward III. and endowed the college for a Master and six Fellows, giving it the appellation of Maria de Valencia, the family name; which has since been changed for the title. This eſtabliſhment has been greatly increaſed by ſucceeding benefactors; particularly by Henry VI. who augmented it with the rich living of Soham and other rectories.

*Pembroke Hall is nearly opposite to St. Peter's college, on the east side of the street; and contains two courts; the one next the street is near 100 feet long and 55 broad, and has the Library on the north, and the Hall on the east, which ſeparates the two courts. The back court is nearly of the ſame dimensions, but the buildings of both are ancient and make but a mean appearance.

THE CHAPEL, which, with the Lodge, &c. forms a third ſmall court, is entered from the ſouth-west corner of the first

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* On particular occaſions, an antique ſilver cup, formerly belonging to the foundreſs of the college, is produced. Several pieces of curious plate are still in poſſeſſion of various colleges; and their collection would have been much larger, had not loyalty prompted them to ſend their plate to King Charles, to be coined for his uſe.

court, through a cloister; it was built by Biſhop Wren, from a design of his brother Sir Christopher Wren, and is an elegant building of the Corinthian order, reckoned one of the best proportioned Chapels in the University; it is, within side, about 54 feet long, 24 broad, and upwards of 30 high; and is fitted up and decorated in a neat and appropriate manner.

The Library, which occupies almost the whole of the north side of the first court, is a large and handſome room, containing a good collection of well-claſſed and choice books.

The Hall is a very neat room, about 42 ſeet long and 27 broad. Here are portraits of Sir Benjamin Keene, painted at Madrid; Biſhop Ridley and John Bradford, Martyrs, copied from prints in Holland's Hoorologia; Nicholas Felton, Biſhop of Ely; and Mary de Valencia, the foundreſs, a copy by Marchi, extremely well done. The Combination-room is at the end of the Hall, and contains the following portraits: Edmund Spencer, half length, ſaid to be copied by Wilſon, from an original; Edward Grindall, Archbiſhop of Canterbury, on wood; Benjamin Linley, Biſhop of Ely; Roger Long, L. D. by B. Wilſon.

The Lodge is a convenient and neat structure, but gloomily situated; it contains, among others, the following pictures: a large painting of the feast of the Gods, from the ſchool of Rubens; a curious Flemiſh piece, on board, called the Twelfth-night King and Queen; and a ſmall half length of Mr. Gray the Poet; who resided here, when the miſchievous pranks of the students had cauſed him to deſert Peter-Houſe.

In the back court is a curious hollow Sphere, invented by Dr. Roger Long, and constructed by himſelf, and Mr. Jonathan Munn, an ingenious Tin-plate worker at Cambridge; it is contained in a brick building, erected for the purpoſe; and is eighteen feet in Diameter: above thirty perſons may conveniently sit within it. The entrance to it is by six steps; and the whole is turned round by a ſmall winch, with as little labour as it takes to wind up a jack, though its weight altogether is above 1000 pounds. This curious machine is now much damaged, and fast falling to decay.

The college garden is large, pleaſant, and well stocked with fruit trees; and contains a good bowling-green, and cold-bath.

Among the eminent men educated at this college are: Edmund Grindall, Archbiſhop of Canterbury; Benjamin Laney, Biſhop of Ely; George Prettyman, Biſhop of Lincoln; William Lindwood, Biſhop of St. David's, and author of the *Provincial*; Biſhop Ridley, and John Bradford, martyrs; Robert Thorpe, Lord Chancellor in the reign of Edward 3d. John Rogers, who tranſlated the Bible, and was the firſt perſon put to death by Queen Mary; Edmund Spencer, the Poet. and celebrated author of the *Fairy Queen*; William Maſon, the Poet; Thomas Stanly, author of a *Hiſtory of Philoſophy*; Henry Iſaacſon, the Chronologer; Dr. Roger Long, the Mathematician; the Right Honourable William Pitt, Chancellor of the Exchequer, High Steward of the University, &c.

This college consists of a Master, fourteen foundation, and two bye Fellows. The whole number of members in 1802 was 80. The Visitor, is the Lord Chancellor.

CORPUS CHRISTI OR BENE'T COLLEGE.

The real name of this College is *Corpus Chriſti and the Bleſſed Virgin Mary*; but it is uſually called St. Benedict's, or Bene't college, from its vicinity to the church of that name, which belongs by appropriation to the ſociety. The origin of this college differs from that of any other in the University; being eſtabliſhed by the union of two gilds or ſocieties, reſpectively called Corpus Christi and the Bleſſed Virgin. The college was began, in 1344, by the ſociety of Corpus Christi; who, being joined by the other ſociety, advanced with the building; which appears to have been perfected by Henry Plantagenet, Duke of Lancaster, who was choſen as their *Alderman*. By the munificence of Sir John Cambridge, the revenues were greatly increaſed, and finally appropriated, on March 21, 1356, to the maintenance of a Master, eight Fellows, three bible clerks, and six Scholars. The endowments have been much augmented since then by ſucceeding benefactors; and particularly by Archbiſhop Parker, who added two Fellowſhips, appropriated to the city of Norwich, and fourteen Scholarſhips; he gave alſo many very considerable benefactions, and made a large addition to the Library, by a collection of printed books and rare and valuable M. S. S. to be mentioned hereafter.

This college consists of one principal court and a ſmall back court; the former contains the Hall and part of the Master's Lodge on the ſouth side, and the apartments of the Fellows and students occupy the rest of the ſquare; which is ancient and falling to decay; but is intended to be rebuilt on an elegant plan (which has been already taken and ſhewn for inſpection,) with a legacy of £1000. left by Dr. Thomas Herring, Archbiſhop of Canterbury; and a still larger one, by Dr. Mathias Mawſon, Master of the college, and Biſhop of Ely.

THE CHAPEL is situated in the back court; it is a ſmall but very neat apartment, with a beautiful Altar-piece of carved wainſcot, ſupported by two noble pillars; in the middle of which, is a pannel of crimſon velvet in a handſome gilt frame, the gift of Sir Jacob Astley, formerly a member of the ſociety. The Anti-chapel was built by the Lord Keeper, Sir Nicholas Bacon; over the door is this inſcription, in gold letters:

> *Honoratiſs. Ds. Nicholaus Bacon, Cuſtos Magni Sigilli Angliæ extruxit. Dominicæ Salutis,* 1578. *Regni Elizabethæ* 21. *Anno Ætatis suæ* 68. *Cancellariatus* 21.

THE LIBRARY is over the chapel; and, though not conſpicuous for architecture or ornaments, 'is esteemed one of the most valuable in the kingdom, for manuſcripts relating to eccleſiaſtical affairs. It was left by Archbiſhop Parker, with the following particular restrictions. Every year on the 6th of Auguſt, it is to be viſited by the maſters of Trinity Hall and Caius, with two ſcholars on the archbiſhop's foundation; and if, on examination of the library, 25 books are miſſing, or cannot be found within ſix months, the whole devolves to Caius, In that caſe the maſters of Trinity Hall and Bene't are viſitors; and if Caius be found guilty of the like neglect the books are delivered up to Trinity Hall; then, the Maſters of Caius and Bene't become the viſitors; and in caſe of default on the part of Trinity Hall, the whole collection reverts back to its former order. The books are ſo carefully kept that even a Fellow of the college is not admitted to enter the Library, unleſs accompanied by another Fellow or Scholar, who must attend him during his stay, according to the Archbiſhop's will. Here is a portrait of Archbiſhop Parker, thought to be an original.

THE HALL is a large and handſome room, with two large bow windows, beautifully ornamented with painted glaſs, of the arms of ſeveral masters and benefactors.

THE MASTER'S LODGE is not large, but contains ſome good apartments, particularly a long gallery; and has a good garden at the back of the houſe. Among the pictures are the following: Eraſmus on board; Cardinal Wolſey; Thomas

Lord Cromwell; Sir Thomas Moore; Robert, Earl of Leiceſter; Richard Love, by D. Mytens; Mathias Mawſon, Biſhop of Ely, by Heins; John Fox, the Martyrologiſt; Archbiſhop Parker; Samuel Bradford, by Enoch Zeeman; William Coleman, by Romney; Edward Tennyſon, Biſhop of Oſſory, by Kneller; John Spencer, and John Barnardiſton, by Vandermyn; and the portraits of many other diſtinguiſhed perſons.

Among the plate of this college is a curious antique horn, figured and deſcribed by the late Rev. Michael Tyſon, B. D. F. S. A. formerly Fellow.

With the eminent men of this college are: Archbiſhop Parker; Richard Cavendiſh, Phyſician, and tranſlator of Euclid; Nathaniel Salmon, author of the "Antiquities of Hertfordſhire and Eſſex;" Benjamin Hoadley, author of the *Suſpicious Huſband*; Richard Gough, Eſq. the learned Topographer; Philip, Earl of Hardwicke, High Steward of the Univerſity; Dr. James Yorke, the preſent Biſhop of Ely, &c.

This college conſiſts of a Maſter, twelve Fellows, and near ſixty Scholarſhips. The whole number of members in 1802, was 52. Viſitors, the Vice-Chancellor and two ſenior Doctors of Divinity. In extraordinary caſes the King.

GONVILE AND CAIUS COLLEGE.

Or more commonly *Key's College*, was originally founded, in the year 1348, by Edmund Gonvile, rector of Terrington and Ruſhworth in Norfolk; who began the building near the garden, &c. of Bene't college. He did not however live to carry his plan far into execution; but, on his death, left a ſum of money for its completion, at the diſpoſal of William Bateman, Biſhop of Norwich; who, being engaged with his own foundation of Trinity Hall, removed the ſite of Gonvile's, and, having fixed it near his own, endowed it for the ſupport of a Maſter, four Fellows, and two Scholars, giving it the name of Gonvile Hall. Between this period and the year 1557, the revenues of Gonvile Hall were augmented by many donations, and in that year, John Caius, M. D. Phyſician to Queen Mary procured a charter of incorporation, where its name was changed to Gonvile and Caius College. He likewiſe endowed it with ſeveral demeſnes and benefactions; doubled the number of Fellows, and built a new court, and three remarkable gates.

Caius College is ſituated north of the Senate-Houſe, and conſiſts of three courts; which are entered by the three remarkable gates erected by Dr. Caius. The firſt, which is next the ſtreet, is in a very ſimple ſtyle, with this inſcription:

"HUMILITATIS."—The Gate of Humility.

The ſecond, which is a noble portico in the middle of the college, is in a very fine ſtyle of architecture; it has two inſcriptions, on one ſide is written:

"VIRTUTIS."—The Gate of Virtue.

And on the other ſide is this inſcription:

"*Jo. Caius Poſuit Sapientiæ.*"

JOHN CAIUS built this in Honor of Wiſdom.

The third, leading to the Schools and Senate-Houſe, is more ornamented, exhibiting ſpecimens of the Doric, Ionic, and Corinthian orders. This is inſcribed:

"HONORIS."—The Gate of Honor.

The court next the ſtreet, called the Tree-court, is a neat ſmall building with trees planted in the front. The one next the Schools is larger; having the Chapel on the north, and the apartments of the ſtudents, built neatly with ſtone, on the other ſides. The third, or Fellows' court, is in a more modern ſtyle; being elegantly caſed with ſtone and ſaſhed, and forms a handſome quadrangle.

The Chapel is ſmall but beautiful; and is handſomely fitted up with wainſcotting of Norway Oak, neatly carved. On each ſide the entrance, are elegant ſeats for the Maſter and Preſident, and over them a gallery for the Maſter's family. It has a very neat altar, with a painting of the *Annunciation*. after Carlo Maratti. This Chapel contains alſo a grand tomb, erected to the memory of Dr. Caius, who lies buried there. His epitaph, from its quaint yet expreſſive turn has been often quoted:

"Fui CAIUS.
VIVIT POST FUNERA VIRTUS."

I was Caius. Virtue our death ſurvives.

The Library, *which is* entered from the Combination-room is not large, but contains ſome very valuable books and manuſcripts; eſpecially on heraldry and genealogy.

The Hall is a good room, at the north end of the third court; 39 feet long, and 21 broad, and has lately been embelliſhed with an elegant cove ceiling, and other decorations. The Combination room is handſomely fitted up, and well adapted to its purpoſe.

The Master's Lodge is a modern and ſpacious building of brick, with a good garden in front; and contains portraits of nearly all the Maſters from the re-founding of the college. The following are the moſt curious: an original portrait of Dr. Caius, on board; Sir Thomas Gooch, Bart.

and Biſhop of Ely, eſteemed a correct likeneſs; Sir James Burrough, Knt. by Heins; John Smith, D. D. by Sir Joſhua Reynolds; Robert Trapps, Alderman of London, and his wife Joanna, both painted by Holbein, reckoned very fine. In the Hall are a great many portraits of eminent Phyſicians.

Among the moſt eminent men educated at Caius College are: Jeremy Taylor, Biſhop of Connor; Sir James Burroughs, Knt. an ingenious architect; Lord Thurlow, Lord Chancellor of England; Dr. William Harvey. famous for his important diſcovery of the circulation of the blood; Sir Thomas Greſham, founder of the Royal Exchange; Dr. Branthwaite, a tranſlator of the Bible; William Watts, editor of *Mathew Paris*, and aſſiſtant in Spelman's Gloſſary; Francis Bloomfield, author of the Deſcription of Norfolk, &c. and a long liſt of eminent Phyſicians; who have ariſen, ſays Fuller, as if Dr. Caius had bequeathed a medicinal genius to the college.

The preſent ſociety conſiſts of a Maſter, twenty-ſix Fellows, and ſeventy-ſeven Scholarſhips. The whole number of members in 1802 was 104. Viſitors, the Maſter of Bene't, the ſenior Doctor of Phyſic, and the Maſter of Trinity Hall.

TRINITY HALL

Was originally one of the Hotels for the accommodation of ſtudents; but was purchaſed by Richard Crowder, Prior of Ely, in the reign of Edward III. for the monks of Ely to ſtudy in. It was afterwards enlarged by Richard Ling, Chancellor of the Univerſity; and, in the year 1351, was ſold to Biſhop Bateman with the lands thereto appertaining; who, having obtained the King's licenſe to erect it into a college, dedicated it to the Holy Trinity, and appointed a Maſter, three Fellows, and two Scholars to be ſtudents in the cannon and civil law, alſo one Fellow to ſtudy Divinity, and be chaplain to the college.

This college is more particularly confined to the ſtudy of civil law, the Profeſſor being always a member of the ſociety. It is detached from the town; being ſituated behind Caius College, and a little to the north of Clare Hall, on the banks of the river. It conſiſts of one large court and other buildings; and is, throughout, handſomely built with ſtone and uniformly ſaſhed.

THE CHAPEL is ſmall, but exceedingly neat and appropriate; it has at the altar a fine painting of the *Preſentation in the Temple.* by Stella, in which ſeven figures are introduced and two boy-angels: the expreſſion is very ſpirited and the colouring fine.

THE HALL is a remarkably handſome room, 36 feet long, 24 broad, and 25 high; and has a gallery for muſic at the north end. At the upper end is a fine portrait of Sir Nathaniel Lloyd, Knt. with whoſe bequeſt of £3000. towards improving the college, this apartment was principally built; here is alſo a fine buſt of the late celebrated Earl of Mansfield, by Nollikins, the gift of Sir James Marriot, late maſter. (The figure on his Lordſhip's monument in Weſtminſter Abbey, was taken from this buſt.) The Combination.room is extremely neat; and contains the portraits of John Andrews, L. L. D. and Samuel Johnſon, L. L. D.

THE LIBRARY is neatly claſſed, and contains beſides a large collection of choice and valuable books, a complete ſtudy of civil and common law.

THE LODGE is ſmall and inconvenient, and has not been for ſome time inhabited by the Maſters, who ſeldom reſide in

Cambridge, but appoint a Vice-maſter. It contains the portraits of Stephen Gardiner, the Popiſh Biſhop of Wincheſter; Philip Dormer Stanhope, Earl of Cheſterfield, by Hoare; and ſeveral others. The garden, at the back of the college, is extremely pleaſant, enjoying the ſame view as Clare Hall, its neighbour, with a terrace on the bank of the river.

John Andrews, L. L. D. late Fellow of this college, has bequeathed £20,000. for the erection of a new building; which is to conſiſt of two ſpacious wings or buildings, to extend from the college towards the river, leaving the proſpect open, This bequeſt was left in 1747, and to come to the college at the deceaſe of two maiden ſiſters,

With the various learned characters educated here are: Thomas Tuſſer, an author on Huſbandry, &c. Dr. Gabriel Harvey, a famous Poet and Orator: Dr. Cowell, famous for his *Inſtitutiones Juris Anglicanæ;* the celebrated Earl of Cheſterfield; Sir Robert Maunton, author of *Fragmenta Regalia;* Sir James Marriot, late Judge of the Admiralty; and the Right Honourable Sir William Wynne, the preſent maſter.

This ſociety conſiſts of a Maſter, twelve Fellows, and fourteen Scholarſhips. The whole number of members in 1802, was 82. Viſitor, the King.

KING's COLLEGE.

This Royal and magnificent foundation derived its origin from the general regard to the intereſts of literature, poſſeſſed by Henry VI. who inſtituted a ſmall ſeminary on this ſpot for a rector and twelve Fellows, in the year 1441; but in 1443, he entirely changed its form, and endowed it for a Provoſt, ſeventy Fellows and Scholars, (to be ſupplied in regular ſucceſſion from Eton, eſtabliſhed nearly at the ſame time) three chaplains, ſix clerks, ſixteen choriſters, and a muſic-maſter, (who now poſſeſſes alſo the office of organiſt) ſixteen officers of the foundation, twelve ſervitors for the ſenior Fellows; and ſix poor Scholars; amounting in all to 140.*

If the building of this college had been finiſhed according to the plan of the founder, its architecture would have rivalled the moſt ſplendid palaces in Europe, or perhaps the world; but the diſcord and tumult with which the kingdom was filled, diſtracted the King's attention, and forced him to recede from his deſigns: enough has however been effected to record his munificence. This college is ſituated between Trumpington-ſtreet and the river; and may be reckoned the fineſt college in this, and indeed in any other, Univerſity; for though it may be inferior to Chriſt Church in Oxford in ſome reſpects, yet, in others, it is ſuperior even to that ſplendid foundation. It is compoſed of ſeveral detached piles of building. The old court is north of the chapel, between the Schools and Clare Hall: it is about 120 feet long, and 90 broad, is built of ſtone, and is extremely lofty; though, from its being very ancient, it contains but a ſmall number of convenient apartments. The Hall is on the north, and the Combination-room on the ſouth ſide of the court; and the eaſt ſide is formed by part of the Public Library and Schools. The new court is a noble quadrangle, upwards of 300 feet long, and almoſt as many broad. It is formed by the Chapel on the north, a magnificent new building on the weſt, and a very large lodge for the Provoſt on the eaſt. The ſouth ſide of this grand ſquare is not yet completed; but it is intended to erect a grand pile of building, which is to contain a Hall, Provoſt's lodge, and other apartments; and to be ſeparated from the ſtreet by a magnificent colonnade. This plan, whenever it is carried into execution, will certainly be a great ornament to the town as well as the college.

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* Some peculiar privileges appertain to this college. The Provoſt has abſolute authority within the precincts; and the under-graduates do not keep any public exerciſes in the ſchools, nor are examined for their Bachelor of Arts' degree.

The Chapel is the principal object of attraction at this college. This ſuperb ſtructure is conſidered as the moſt perfect ſpecimen of Gothic architecture remaining in Europe. When viewed on the outſide, the maſſive ſtone with which it is compoſed, and the immenſe buttreſſes that ſupport it, raiſe an idea of the moſt uncommon ſolidity: though this idea is but tranſient; the height and magnitude of the building, its open-worked battlements, and finely proportioned pinnacles and towers, exalt the fleeting emotions that ariſe from the conſideration of its ſtrength, into the ſenſations that emanate from the contemplation of its ſublimity and grandeur. The extreme length of this magnificent edifice is 316 feet, the breadth 84 feet, the height from the ground to the ſummit of the battlements 90 feet, to the top of the pinnacles more than 101 feet, and to the top of each of the four corner towers 146½. feet. Within ſide, the length is 291 feet, the breadth 45½, and the height 78 feet. The architect was named Cloos; the father of Nicholas Cloos, who was made a Fellow of the college by Henry VI. in 1443, and afterwards Biſhop of Litchfield. The original building begun by Henry VI. was lengthened out 188 feet, and the outſide wholly finiſhed by Henry VII. The inſide, the ſtalls, painted windows, carvings, &c. were the work of Henry VIII.

The interior view of this Chapel is yet more ſtriking and impreſſive than the exterior. The vaſt arched roof, unſuſtained by a ſingle pillar, with its voluminous ſtones, diſplaying all the elegance of fan-work, and ſeeming to hang in air, at once aſtoniſhes and confounds. The chapel has two roofs, between which a man may walk upright. The inner roof is of ſtone in the form of a Gothic arch, but is ſomewhat flattened at the centre; where are fixed at equal diſtances, and perpendicularly, ponderous ſtones, beautifully ornamented with roſes and portculliſes; every one of which is ſaid to weigh more than a ton, and are above a yard in thickneſs, projecting far beyond the other carved work of the ceiling. The diſpoſition of the materials of this roof, (which is without even the appearance of a pillar to uphold it, its only ſupport being the towers and buttreſſes,) and of theſe ſtones in particular, may be juſtly ranked among the moſt remarkable efforts of architectural ingenuity. It was greatly admired by Sir Chriſtopher Wren; who, according to tradition, went once a year to ſurvey this roof, and ſaid that, if any man would ſhew him where to place the *firſt ſtone*, he would engage to build ſuch another: and competent judges of the preſent day poſitively aſſert, that to lay a roof of ſtone in the ſame order is beyond the ſkill of modern architects. Over this inner-roof is one of timber, covered with lead.

The walls, on the inſide of the Anti-chapel, are ornamented with carved ſtone of exquiſite, and almoſt inimitable, workmanſhip; repreſenting the arms of the houſes of York, and Lancaſter, with a vaſt many crowns, roſes, portculliſes, and fleur de lis. In the middle of one of theſe roſes, at the weſt end, is a ſmall figure of the Virgin Mary.

About the middle of the chapel is a ſcreen and Organ-loft of wood, richly and curiouſly carved; which ſeparates the Anti-chapel from the Choir. It was erected in 1534, when Anne Boleyn, was Queen to Henry VIII. The weſt ſide is ornamented with ſeveral lovers' knots; and a pannel near the wall, on the right, diſplays the arms of the unfortunate Anne, impaled with thoſe of the King. On a pannel, at the upper part of the ſcreen, is a piece of ſculpture in very bold relief; which repreſents the Almighty hurling the rebellious Angels from

Heaven. This ſmall piece is univerſally admired, and large ſums of money have been offered for it. On this ſcreen ſtands a noble organ, which has been lately erected at a great expence, by Mr. Avery, it is one of the largeſt in the kingdom, and much admired for its tones. But this, though lofty, does not prevent the eye from enjoying a full view of the elegant roof, from the great weſt door to the eaſt window: and here it is, that the ſpectator is filled with that rapture and admiration which this ſublime monument of architecture always commands. A ſtructure of theſe dimenſions, and compoſed of the moſt ſolid and durable materials, yet, appearing to the eye light, airy, and elegant; may fairly be styled the triumph of Gothic architecture.

On the top of the ſcreen were formerly placed nine colours, taken from the Iſland of Manilla, by Sir William Draper, in 1762; and, by permiſſion of his Majesty, given by him to the college, of which he was a member. Theſe have been lately removed to the Library.

In the middle of this partition, through large folding doors finely carved in open work, and lined with crimſon, you enter the Choir; which has an air of uncommon grandeur. It has been lengthened by the ſpace of a window; and is, from the entrance quite up to the altar, paved with fine marble. On each ſide are two rows of stalls of carved dark wood. The back part of the upper row (which is for the graduate Fellows) is completed with fifty-four pannels; in fifteen of which, on each ſide of the Choir, are carved the arms of all the Kings of England, from Henry V. to James I. the arms of the two Univerſities, Cambridge and Oxford; and of the two colleges, King's and Eton. Theſe arms are carved with great ſkill; the ſupporters have a high relief, and appear to advance from the pannels in full proportion. On each ſide the entrance are the ſeats of the Provoſt and Vice-Provost. Behind the Provoſt's stall, on the right hand of the entrance, is St. George and the Dragon, and ſome other carvings, exceedingly well executed. The lower row of stalls are for the under-graduate Fellows, Scholars, and ſinging-men. Beyond theſe are benches, on two of which, on each ſide, ſit the Choriſters.

The whole eaſt end of the chapel, which had remained unfiniſhed till within theſe few years, is now completed in a ſtyle of ſymmetry, nearly correſponding with the general magnificence of the building. A grand altar-piece has been erected, under the inſpection of the late Mr. James Eſſex, F. S. A. which is executed with great taſte, and is peculiarly appropriated to the elegance of the reſt of the chapel. This altar-piece has been ſtill farther embelliſhed, with a fine painting of the *Taking down from the croſs*; preſented to the ſociety by the Earl of Carliſle, who was of this college. The painting was purchaſed by his Lordſhip, when travelling on the Continent, as the work of Daniel de Volterra; but connoiſſeurs are of opinion that it is actually a production of Raphael, and one of the best, in the ſecond manner, of that immortal master.

But theſe are not the only circumstances that have promoted the fame of this chapel; an additional cauſe of its celebrity may be found in the exquiſite beauty of its painted windows. There are twenty-ſix windows in the Gothic form, each of which is nearly fifty feet high. Twenty-five of theſe windows are painted in colours the most brilliant and beautiful imaginable; the ſubjects of which are taken from the Old and New Testament. The great west window is the only one left plain, and that appears to have been done in order to give light to the chapel; as that window alone, is ſuppoſed to admit more light than half the rest. The ſubjects of the paintings are expreſſive of the most interesting ſcriptural events, and are upwards of 100 in number. In the arrangement of the ſubjects, a peculiar order has been obſerved, and ſomething like a concordance attempted. Each window is ſeparated by munnions into five lights, and theſe are divided, about the middle, into upper and lower parts, by a stone tranſom. In the upper parts of the windows, the ſubjects are always taken from the Old Testament; and in the lights immediately underneath, are repreſented ſome circumstances taken from the New Testament, correſponding in ſome degree with thoſe above. Thus a peculiar correſpondence is obſerved, throughout the whole, between the delineations of the upper and lower diviſions of the ſame window. In the central light of each diviſion is depicted an Angel and a Saint, exhibiting ſcrolls and labels, deſcriptive of the events repreſented in the other lights, on each ſide. The east window differs from the others: the upper and lower diviſions are ſeparated, by buttreſſes, into three compartments; and theſe are again ſubdivided, by munnions, into three lights, occupied by one ſubject. Theſe ſix ſubjects are all derived from the New Testament; and repreſent, in colours of almost inconceivable beauty, the Crucifixion, and the most material events immediately connected with it.

We have ſubjoined an explanation of the paintings in each window; but how, to thoſe who have not ſeen them, ſhall we be able to convey the ſmalleſt idea of their ſuperlative beauty? The following account must be conſidered as merely a *liſt* of the ſubjects repreſented in theſe windows: their full deſcription would fill volumes. In the greatest part of them the strong contrast, energy, and variety of character; the judgment evinced in the diſpoſition and grouping of the figures; the boldneſs and freedom of the pencilling; the ſublimity of the deſigns; the richneſs and brilliancy of the colouring; and the exquiſitely characteristic expreſſion of the countenances, and majestic flowing of the draperies; are, all, astoniſhingly natural, and have very rarely been parallelled; ſcarcely ever exceeded!* But, however imperfect may be the powers of deſcription, it is hoped the following account of the ſeveral ſubjects, will aſſiſt the ſpectator in his examination of them.

NORTH SIDE.

FIRST WINDOW.

Inexplicable.

SECOND WINDOW.

Upper Diviſion.

Left Side.—Theſe two lights repreſent an offering, preſented to God by Joſeph and Mary before their eſpouſals.
Right Side.—The eſpouſals of Tobias and Sarah.

Lower Diviſion.

Left Side.—Jephthah offering his daughter.
Right Side.—The eſpouſals of Joſeph and Mary.

THIRD WINDOW.

Upper Diviſion.

Left Side.—The temptation of Eve.
Right Side.—God appearing to Moſes in the burning buſh.

Lower Diviſion.

Left Side.—The Salutation of the Virgin Mary.
Right Side.—The Birth of Christ.

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* We are happy in having an opportunity of informing the Public, that a ſeries of prints from theſe intereſting windows are intended to be engraved, and published under the direction of Mr. J. K. Baldrey, Cambridge. The paintings are all to be copied by himſelf, and the engravings coloured in imitation of the originals. The drawing of the Eaſt-window is already completed, and now exhibiting at the Artiſt's houſe.

FOURTH WINDOW.

Upper Diviſion.

Left Side.—The ceremony of circumciſion firſt performed by Abraham.

Right Side.—Queen Sheba offering preſents to King Solomon.

Lower Diviſion

Left Side.—The circumciſion of our Saviour.

Right Side.—The wiſe men offering gifts to Chriſt.

The flowing of Mary's Drapery; the child's figure; the attitude and expreſſion of the MAGI approaching Chriſt with veneration, and the richneſs of his mantle, are all remarkably beautiful. A brilliant ſtar is ſeen in the upper part of the painting.

FIFTH WINDOW.

Upper Diviſion.

Left Side.—The inſtitution of the purification of women.

Right Side.—Jacob, to avoid the fury of Eſau, is ſent to Haran.

Obſerve the aged and venerable countenance of Iſaac.

Lower Diviſion.

Left Side.—The purification of the Virgin Mary

The face of the perſon who is carrying Chriſt; the cage and doves; have great merit.

Right Side.—Joſeph, to avoid the fury of Herod, travels with Chriſt into Egypt.

SIXTH WINDOW.

Upper Diviſion.

Left Side.—The children of Iſrael worſhipping the molten calf.

The calf and pillar are extremely well executed.

Right Side.—Pharaoh's cruelty to the Hebrew children.

Lower Diviſion.

Left Side.—Simeon bleſſing Christ in the temple.

The attitude and dreſs of Simeon are the principal beauties of this piece.

Right Side.—Herod's cruelty towards the Jewiſh children.

The figure of Herod on Horſeback is majeſtic. But especially obſerve the mercileſs looks of the assassin, who is unsheathing his ſword over the infant at his feet.

SEVENTH WINDOW.

Upper Diviſion.

Left Side.—Naaman waſhing in Jordan; whereby he was cleanſed from his leproſy.

Right Side.—Eſau tempted to ſell his birth-right.

Lower Diviſion.

Left Side.—Christ baptized, by St. John, in Jordan.

Right Side.—Christ tempted in the wilderneſs.

EIGHTH WINDOW.

Upper Diviſion.

Left Side.—Eliſha raiſing the ſon of the Shunamite.

This painting is altogether very fine; particularly the building.

Right Side.—David returning from battle in triumph, with the head of Goliath. Women meeting him, playing on their harps.

The harp, and woman bearing it have great beauty.

Lower Diviſion.

Left Side.—Christ raiſing Lazarus from the dead.

The geſture of Lazarus, and his death-like countenance are finely done.

Right Side.—Christ riding in triumph to Jeruſalem. Zaccheus mounted on a tree.

The expressive looks of Zaccheus, whoſe eyes are earneſtly fixed on Christ, deſerves great praiſe.

NINTH WINDOW.

Upper Diviſion.

Left Side.—Manna falling from Heaven, for the murmuring Iſraelites.

Right Side.—The casting of the rebellious Angels from Heaven.

Lower Diviſion.

Left Side.—The last Supper.

Right Side.—Our Saviour praying in the garden: the Apostles aſleep.

TENTH WINDOW.

Upper Diviſion.

Left Side.—Cain ſlaying his brother Abel.

Right Side.—Noah drunk with new wine. One of his ſons casting a garment over him.

Lower Diviſion.

Left Side.—Judas the betrayer of Christ, and the instrument of his death. Peter ſmiting the High-Priest's ſervant.

Obſerve the deceitful looks of Judas: and more particularly remark the cheeks of the trumpeter; which appear distended with wind, and ſwelling from the glass. The terrified looks of the High-Priest's ſervant is naturally repreſented.

Right Side.—Christ bound and blindfolded.

The meek and patient reſignation of Christ is admirably perſonified here, as in most of the pieces. The figure of a woman, in the upper part of the painting, is extremely well executed.

ELEVENTH WINDOW.

Upper Diviſion.

Left Side.—Jeremiah impriſoned by King Zedekiah.

Right Side.—Shemei curſing King David.

The ungovernable fury in the countenance of Shemei, and the contrasted and downcast looks of David, are esteemed by connoiſſeurs masterly done.

Lower Diviſion

Left Side.—Chriſt (a priſoner) before Caiaphas.

The angry expreſſion of the high-prieſt, Caiaphas, the brilliancy of his robes, the ſplendid throne on which he is ſeated, the rich canopy above it, and the harſh aſpect of a man near Chriſt, ſuppoſed to be ſaying "Anſwereſt thou the high-prieſt thus?" are each uncommon beauties, and worthy of particular obſervation.

Right Side.—The Soldiers mocking Chriſt before Herod.

The expreſſion of exultation in the countenance of Herod is extremely good. The curtain has great beauty.

TWELFTH WINDOW.

Upper Diviſion.

Left Side.—Job tempted by Satan and his wife.
Right Side.—Chriſt's eſpouſals to the church.

Lower Diviſion.

Left Side.—Chriſt crowned with thorns.
Right Side.—Chriſt ſcourged.

THE EAST WINDOW.

This grand window, as we before obſerved, is divided into nine lights above, and nine below; each ſubject being contained in three lights; the whole window conſiſting of ſix ſubjects. This is eſteemed the fineſt window in the chapel; both for the merit of the painting, its ſize, its ſituation, and its ſubject; being the hiſtory of the principal events relative to the *Crucifixion.*

In the centre of the upper diviſion is the *Crucifixion.* Jeſus is repreſented on the croſs between two thieves. The countenance of the penitent thief expreſſes the moſt extreme ſorrow, accompanied with tears; but that of his hardened companion is ſtrongly marked with deriſion, and mockery. Below the Saviour is Mary Magdalen embracing the croſs; and in the foreground three Soldiers, caſting lots for his garment: the expreſſion of one of them is uncommonly fine; he appears pointing to the dice, and exulting at the ill ſucceſs of his comrade. On the left is St. John and the Virgin: the face of the former diſplays exquiſite feeling, united with reſignation; that of the latter, heart-rending anguiſh.

The centre of the lower diviſion repreſents Pilate waſhing his hands, and declaring himſelf innocent of the death of Jeſus. Great and anxious feeling is diſplayed in the face of Pilate, who is ſeated under a magnificent canopy. Below the judgment-ſeat is Chriſt, bound with a crown of thorns on his head; and ſurrounded by ſeveral figures, who are ſtrongly characteriſed: the features of one diſplaying all the ſavage brutality of an aſſaſſin; another has a whip up lifted, and his hand twined in the hair of the unreſiſting Jeſus; who is turning to his unfeeling perſecutor, with a look of ſuch meekneſs and feeling, as might diſarm malice of its frown, and convert hatred into reverence.

In the lower diviſion, on the right, is Chriſt delivered to be crucified. The countenance of Jeſus is again remarkably fine. And the faces and attitudes in general are marking and expreſſive.

The left ſide repreſents Chriſt bearing the Croſs. Pilate appears on horſeback, accompanied by a High-Prieſt and many attendants. Jeſus, nearly fainting with fatigue, is receiving a napkin from a female, whom he ſurveys with grateful benignity: preceding Chriſt is a Soldier holding the cords of the croſs, with features expreſſive of the moſt ferocious brutality. Near him is a man bearing a hammer, with malignant exultation painted in his countenance. In the diſtance is Mount Calvary.

In the upper diviſion, on the right, is Chriſt nailed to the croſs. Pilate's countenance here, as throughout the hiſtory, expreſſes remorſe. Jeſus is extended on the croſs: his body appears drawn up, and lying hollow, from the violence of the pain of driving the nails through his hands. The attitude and expreſſion of the man employed in this horrid buſineſs are admirable. In the fore-ground is a man with a baſket of tools, who ſeems to have been at work on the croſs: the ferocious triumph painted on his features is extremely fine.

On the left ſide is Chriſt taken from the croſs. Every muſcle of the body of Jeſus appears relaxed by death. On the left is the Virgin and St. John: the former is portrayed fainting, while a female is ſupporting her. Moſt of the figures introduced in this piece have an air and expreſſion of deep ſorrow.

Having endeavoured to give an outline of the principal objects in this celebrated window, we proceed to the remaining twelve windows on the ſouth ſide. On part of the upper, as well as the lower diviſion, is continued the hiſtory of the New Teſtament after the death of Chriſt.

FOURTEENTH WINDOW.

Left Side.—The lamentation of Mary Magdalen, and others, for the death of Chriſt.

The expression of grief in the countenances of Mary and the other women, is equal to any of the preceding pieces.

Right Side.—The lamentation of Naomi, and her daughters, for the death of their huſbands.

FIFTEENTH WINDOW.

Upper Diviſion.

Left Side.—Joſeph caſt into a Pit by his brethren.
Right Side.—The paſſage of the Iſraelites from Egyptian ſlavery.

Lower Diviſion.

Left Side.—Chriſt laid in his grave by Joſeph of Arimathea.

The execution of the dead face of Jesus is wonderfully fine.

Right Side.—The paſſage of Chriſt into the regions of departed ſouls.

The attitude of Christ, and the natural flowing of his drapery, possess great merit.

SIXTEENTH WINDOW.

Upper Diviſion.

Left Side.—Jonah coming forth from the Whale's belly, after having lain three days and three nights.
Right Side.—The Angel diſcovering himſelf to Tobit and Tobias.

Lower Diviſion.

Left Side.—Chriſt, after having lain three days and three nights, riſing from the dead. The Soldiers keeping watch.

The beautiful figure of Christ again deſerves admiration.

Right Side.—Jeſus diſcovering himſelf to Mary Magdalen, after his Reſurrection.

The drapery of both these figures is excellent.

SEVENTEENTH WINDOW.

Upper Division.

Left Side.—Reuben coming to the Pit to ſeek Joſeph.

Reuben's garments are extremely beautiful.

Right Side.—Daniel in the Lions' den, and King Darius amazed at finding him alive.

The astonishment expressed in Darius's countenance is a most successful stroke of art.

Lower Division.

Left Side.—The women going to the ſepulchre to ſeek for Jeſus, and to anoint his body.

The blue drapery of Mary Magdalen is exceedingly brilliant, flowing, and natural, and inferior to none in the chapel. The figure of the Virgin Mary possesses much grace and expression.

Right Side.—Mary Magdalen miſtaking our Saviour for the Gardener.

Mary's attitude, and many parts of this piece, are extremely natural.

EIGHTEENTH WINDOW.

Upper Division.

Left Side.—An Angel appearing to Habakkuk.

Right Side.—An Angel holding Habakkuk by the hair over the Lions' den.

Lower Division.

Left Side.—Chriſt appearing to two of his diſciples, in the way to Emmaus.

Right Side.—Chriſt breaking bread to two of his diſciples, at Emmaus.

The expression of aſtonishment in the countenances of the disciples is happily delineated.

NINETEENTH WINDOW.

Upper Division.

Left Side.—The prodigal ſon acknowledging and giving up his licentious life.

Right Side.—Joſeph meeting his father and brethren, in Egypt.

Lower Diviſion.

Left Side.—Thomas acknowledging and giving up his incredulity.

Right Side.—Chriſt appearing to his eleven Apoſtles.

TWENTIETH WINDOW.

Upper Diviſion.

Left Side.—Elijah taken up into Heaven in a chariot of fire; and Eliſha catching his mantle.

The attitude of Elijah, the flowing of the mantle, and the chariot, deſerve the higheſt applauſe.

Right Side.—The law given to Moſes from Sinai. Some of the Iſraelites fallen on their faces at the foot of the mountain.

Lower Diviſion.

Left Side.—Chriſt aſcending into Heaven.

The aſtonishment of the ſpectators is well depicted.

Right Side.—The Holy Ghoſt given to the Apoſtles.

The Virgin Mary is here repreſented with an air of devotion and meekness. This window is altogether as beautiful as any in the chapel; excepting the grand eaſt window.

TWENTY-FIRST WINDOW.

Upper Diviſion.

Left Side.—Peter and John reſtoring a lame man to his feet, at the beautiful gate of the Temple.

The diſtorted appearance of the cripple's knee, which appears to advance out from the glass, is inimitably done; and the other parts of his figure, with his wan and meagre countenance, are extremely natural. The column of the temple is very beautiful and magnificent.

Right Side.—The impriſonment and beating of Peter and John.

Lower Diviſion.

Left Side.—The beggar, reſtored to the uſe of his feet, walking before Peter and John to the Temple.

The piece poſsesses many beauties, particularly the expression of the group of figures.

Right Side.—The death of Ananias.

The expiring figure of Ananias is exquiſitely fine.

TWENTY-SECOND WINDOW.

Left Side.—The converſion of St. Paul.

The light shining from heaven has great merit.

Right Side.—St. Paul preaching at Damaſcus. A ſmall figure of St. Paul, whom the diſciples are letting down from the walls of Damaſcus in a baſket.

Observe the attitudes of the two men letting down Paul: their figures, though too diminutive to discover their beauty by the naked eye are very fine.

Lower Diviſion.

Left Side.—Paul and Barnabas reverenced as Gods. A victim brought before them.

Right Side.—Paul ſtoned.

TWENTY-THIRD WINDOW.

Upper Diviſion.

Left Side.—Paul caſting out a ſpirit of divination from a woman. A figure is repreſented for the ſpirit.

Right Side.—Paul before King Agrippa,

Lower Diviſion.

Left Side.—Paul's friends diſſuading him from his intended journey to Jeruſalem.

Obſerve a beautiful figure of a female kneeling at his feet. A very good and perfect ship; representing the vessel in which Paul had sailed from Ptolemais to Cæsarea, merits obſervation.

Right Side.—Paul before Felix.

The saint or messenger in the middle light, and lower division of this window, is remarkable for the beauty and majeſty of its figure.

TWENTY-FOURTH WINDOW.

Inexplicable.

One obſervation may be made on this window: in the upper diviſion, and the left ſide, is painted the flame of a candle; which is ſo masterly done, that, when the Sun shines on the south ſide of the chapel, a perſon may be deceived with the repreſentation.

TWENTY-FIFTH WINDOW.

Inexplicable.

The arches of all theſe windows are divided into ſmall compartments, called *crockets*, illuminated with the arms and other devices of the Monarchs who contributed towards the building. It is uncertain who were the perſons who gave the original deſigns of the paintings. They have ſometimes been aſcribed to Julio Romano, who flouriſhed when the windows were executed; others have imagined that the drawings of Raphael were reſorted to for the ſubjects; as one of the fineſt paintings, is evidently "the ſtory of Ananias and Saphira, as told by Raphael in the Cartoons." It is moſt probable they were executed, not by one only, but, by many artiſts, and that the beſt pieces extant were choſen as patterns to execute the paintings from.

It has frequently been reported, but erroneouſly, that all the windows of the chapel were taken down and concealed, at the time when the fanaticiſm of the long Parliament induced them to employ Commiſſioners to deſtroy all ſuperſtitious ornaments. By what influence theſe paintings were preſerved is uncertain, as viſitors were certainly ſent down to Cambridge, who ordered the organ to be removed, and ſold its pipes: but it is ſuppoſed the windows were ſpared by the entreaties of Dr. Whichcott, who had been appointed Provoſt by the long Parliament; while others attribute their preſervation to the reſpect Oliver Cromwell retained for the Univerſity, where he received his education.

On each ſide of this building are nine ſmall chapels (each 20 feet by 10) that were probably erected as chantries, and four of them have been undoubtedly ſo appropriated. Theſe chapels are built between the buttreſſes; and, moſtly, communicate with each other. Thoſe on the north ſide are uſed as burial places; and ſeveral of thoſe on the ſouth ſide contain the COLLEGE-LIBRARY; which is well furniſhed with ſcarce and valuable books; amongst which, is a rare and curious manuſcript of the book of Pſalms, which is four ſpans long by three broad and written upon parchment: it is ſaid to have been taken from the Spaniards at the ſiege of Cadiz, in 1691. The ſecond chapel from the west, on this ſide, was conſecrated to religious uſes by Provost Hacombleyn, by whom it was ornamented; and afterwards, by his own deſire, made his burial place. In the window is a portrait on glaſs of Henry VI. and in the centre is a large table monument of marble; on the top of which is a flaming urn, and on the east and west ſides cherubs, ſupporting the family arms, and on the north is a Latin inſcription, ſignifying to whoſe memory it was erected, viz. John Churchill, Marquis of Blandford, ſon of the Duke of Marlborough, who was a student of this college. In August 1801 was erected against the east wall of this chapel, a white marble tablet to the memory of the celebrated Dr. Glynn; who was buried in the large vault, near the north door of the chapel.

THE NEW BUILDING, ſituated on the west ſide of the court, was built by Mr Gibbs. It is 236 feet long, 46 broad, and 50 high; built with Portland stone. It has two magnificent fronts, one to the court, the other to the river, from which it is ſeparated by a large court yard. The facade next the river has a noble and beautiful appearance, and is ornamented with a grand Doric Portico in the centre. The apartments, which are large and convenient, are twenty-four in number: the edifice containing three lofty stories, the upper ones commanding an extenſive and charming proſpect. This building, both as to outward appearance, and interior elegance and convenience, certainly exceeds any other in the Univerſity.

THE HALL is a large room, fitted up in a neat and handſome manner; and the Combination-room is convenient and elegant.

THE PROVOST'S LODGE, though not very pre-poſſeſſing as to outward appearance, is very extenſive, and contains a number of good and elegant apartments; and a wing on the ſouth has been lately erected, containing a handſome Library and other apartments. In the Lodge is a curious portrait on board, of Jane Shore; alſo, a half-length of Sir Robert Walpole, by Dahl; and a good portrait of Dr. John Sumner, late Provost.

Among the most eminent characters who have been educated at this college. are the following: Nicholas Cloos, Biſhop of Litchfield; William Coningſby, Eſq, Justice of the King's Bench in the reign of Henry VIII. Edward Hall, author of the "History of the Wars between the Houſes of York and Lancaster;" Dr. Giles Fletcher, Ambaſſador to Ruſſia, from Queen Elizabeth; Sir John Oſborne, author of the Remembrancer; Sir Robert Morton, Knt. Secretary of State to James I. Sir William Temple, Knt. author of a "Commentary on Ramus;" Sir Francis Walſingham; Dr. Hacombleyn, Provost; William Oughtred, B. D. author of "Clavis Mathematicæ;" Waller, the Poet; Dr. Stanhope, author of the "Paraphraſe on the Epistles and Goſpels;" Dr. King, Editor of *Euripides;* Sir Robert Walpole; Charles, Lord Viſcount Townſend; the great Earl Camden; the Earl of Carliſle; and Sir William Draper, ſo famous for his controverſy with *Junius*.

This college conſists of a Provost, and ſeventy Fellows, or Scholars. The whole number of Members in 1802 was 94. Viſitor, the Biſhop of Lincoln.

QUEEN's COLLEGE

Was founded in the year 1448, and endowed with revenues to the amount of £200. per annum, for the ſupport of a Preſident and four Fellows, by Margaret of Anjou, conſort of Henry VI. The first stone of the Chapel was laid, for the Queen, by Sir John Wenlock (afterwards ſlain at Tewkesbury,) who cauſed the words, *Erit Dominæ noſtræ Margarettæ Dominus in Refugium, et Lapis iſte Signum,* to be engraved on it. The civil wars, which ſoon after commenced, interrupted the work; but Andrew Ducket, their Preſident, obtained, beſides ſeveral other benefactions, the patronage of Elizabeth, Queen of Edward IV. who was prevailed on to complete what her profeſſed enemy had began; and the number of Fellows was advanced to nineteen, beſides forty-five Scholars. The Lady Elizabeth has ſince been annually celebrated as a co-foundreſs. The endowments have been much increaſed by Richard III. and various benefactors.

Queen's College is ſituated between Trumpington-street and the river, behind Catherine-Hall; it conſists of two courts and other buildings. The first court is 96 feet long and 84 broad; is built with brick and stone, but ancient, and is entered by a ſmall tower gate-way. The back court, which extends to the banks of the river, is ſurrounded by a cloister extremely reſembling the nunneries abroad: the Preſident's Lodge is on the north. A pile of building has been newly erected in a neat and handſome manner—though it is but a wing of the intended river-front; which when completed will make a noble and elegant appearance. Over the river is a curious wooden bridge of one arch, ſupported by abutments of rustic stone work.

THE CHAPEL, ſituated in the firſt court, is plain, but extremely neat; it is 54 feet long and 21 broad.

THE HALL, which ſeparates the two courts, is a large, handſome, and well-proportioned room; elegantly fitted up, and furniſhed with a Muſic-gallery over the entrance. At the upper end are the following portraits by Hudſon: Sir Thomas Smith, half length, dreſſed in a fur-cloak and leaning on a globe; Elizabeth Widville, Queen of Edward IV. a very fine painting; and Eraſmus ſeated at a table writing, and dreſſed in a fur-cloak. Theſe three pictures are in very elegant frames; and were preſented to the college by the three ſons of the Earl of Stamford.

THE LIBRARY is neither large nor handſome; but is filled with a ſelection of good and valuable books.

THE LODGE is commodious and extenſive; and contains many valuable pictures, of which, the following may be eſteemed the moſt worthy of remark: Elizabeth Widville, an old painting on board; Daniel Wray, by Dance; Admiral Caleb Barnes, 1665; General Monk; Sir George Saville, Bart. a fine portrait *unknown*, by Reynolds; Eraſmus, by Holbein; and a valuable and a curious altar-piece from the chapel on three pannels; the ſubjects are Judas betraying Christ, the Reſurrection, and Chriſt appearing to the Apoſtles after the Reſurrection: theſe are in the higheſt preſervation and eſteemed a great curioſity.

The gardens and walks of this college, which are on both ſides of the river, and connected by the wooden bridge before-mentioned are retired and pleaſant; the walks are adorned with ſome fine elms and a beautiful terrace-walk extending a great length on the river; and the gardens are plentifully ſtocked with fruit-trees, and a variety of vegetable productions.

The most eminent writers &c. of this college are: Sir Thomas Smith: the Biſhops Fiſher, Poynett, Davenant, and Robinſon; Dr. John Fuller, author of the Worthies of England, &c." Biſhop Patrick, writer of the learned "Commentary on the Old Testament;" Simon Ockley, D. D. author of the "Hiſtory of the Saracens;" the learned Eraſmus; Thomas Brett, author of a learned "Diſcourſe on Church Government, &c."

This ſociety conſiſts of a Preſident, and twenty Fellows. The whole number of members in 1802 was 88. Viſitor, is the King.

CATHERINE HALL.

Was founded, in the year 1475, by Robert Woodlark, Provost of King's College, and Chancellor of the Univerſity; who obtained a charter of Edward IV. and appointed a Master and three Fellows, dedicating it to St. Catherine. The number of Fellows has been ſince increaſed to fourteen, beſides about thirty Scholars and exhibitioners. This has been chiefly effected through the ample donation of Mrs Mary Ramſden, of Norton in Yorkſhire; who was a very conſiderable benefactreſs to the college.

This college is on the west ſide of Trumpington-street; it conſists principally of one large court, about 180 feet long and 120 broad, handſomely built with brick and stone on three ſides; the fourth is open towards the street, with handſome iron palliſadoes, and a piece of ground planted with elms. The north ſide of this quadrangle is occupied by the Chapel, Hall, &c. and on the ſouth is the Master's Lodge. The front of this college, next to Queen's, is of great length, and regularly built, adorned with a handſome Portico at the entrance.

The Chapel is a neat ſtructure of brick and stone; it is about 75 feet long, 30 broad, and 36 high; and, within ſide diſplays much taste and elegance of decoration. In the Antichapel is a handſome marble monument, erected by Sir William Dawes, Archbiſhop of York, to the memory of his lady.

The Hall, which joins the chapel, is a noble and well-proportioned room, 42 feet long, 24 broad, and as many high; it is elegantly stuccoed and furniſhed, and has a fine painting of Robert Woodlark, the founder. In the Combination-room are portraits of Thomas Sherlock, D. D. Biſhop of London, and John Goſtlyn, M. D. a benefactor to the college. Here is alſo a fine painting of St. Catherine, which was brought from Venice by Sir Charles Bunbury.

The Library is over the Hall, and Combination-room; it is a handſome apartment fitted up by Biſhop Sherlock; who bequeathed his own valuable collection of books to the college, with a stipend for a Librarian.

The Master's Lodge is a lofty and ſpacious edifice, elegantly fitted up, and containing ſeveral pictures; among which are four portraits by Sir Godfrey Kneller.

Among the eminent characters of this college are: John Strype, the famous Church Antiquary; Dr. Lightfoot, the Oriental Linguist; Archbiſhop Dawes; Biſhop Long, Editor of the Cambridge *Terence*; Benjamin Hoadley, Biſhop of Winchester; and Thomas Sherlock, Biſhop of London.

This ſociety conſists of a Master, fourteen Fellows, twenty-ſix Scholars, &c. The whole number of members in 1802 was 28. Viſitor, the Lord Chancellor.

JESUS COLLEGE

Was erected on the ſite of an ancient Benedictine Nunnery, founded and endowed by Malcolm, King of Scotland. This eſtabliſhment flouriſhed for ſeveral centuries; but at length falling into decay, it was diſſolved by Henry VII. Its poſſeſſions were granted to John Alcock, Biſhop of Ely; who, in the year 1497, founded this college for a Master, ſix Fellows, and ſix Scholars: but the endowments have ſince been ſo largely increaſed by various benefactors, that they now ſupply maintenance for ſixteen Fellows, and nearly fifty Scholars.

This college is ſituated at the east end of the town. The ſouth or principal front is 180 feet in length, elegantly built and ſaſhed, with a handſome tower-gateway at the entrance. The college has two courts: the first is regularly built on three ſides, the fourth being open to the meadow with iron palliſades, leaving the view uninterrupted for the college. The ſecond court is ſmall and very ancient, ſurrounded by a cloister, and has exactly the appearance of the Nunneries on the Continent. In this cloister are the entrances to the Chapel, Hall, and Master's Lodge.

The Chapel, which was the ancient conventual church, is built in the form of a croſs, having a tranſept, and a large ſquare tower, riſing from arches at their interſection with the nave. The chancel is the only part at preſent uſed for divine ſervice, and is very neatly fitted up. The altar has a fine painting of the *Preſentation in the Temple*, given to the college by Dr. Pearce, the preſent master. The croſs iſles still retain many of the ornaments of former days; and a tomb of one of the nuns is yet remaining, with this ſingular inſcription: "*Moribus ornata jacet hic bona Berta Roſata.*"

THE HALL is a noble room, 54 feet long, 27 broad. and 30 high; it is elegantly fitted up, and aſcended by a flight of steps: at the upper end are half lengths of the following perſons: Tobias Rustat, Eſq. ſitting, a capital picture; Thomas Cranmer, Archbiſhop of Canterbury, copied by Sir Joſhua Reynolds, and preſented to the ſociety by Lord Carysfort; Richard Sterne, Archbiſhop of Canterbury.—In the Combination-room is a fine painting of the founder, John Alcock.

THE LIBRARY is a good room, containing many ſcarce and valuable editions of the claſſics.

THE MASTER's LODGE is large and convenient, and very pleaſantly ſituated. Here are two ancient paintings of Archbiſhops Cranmer, and Bancroft, on board.

This college is ſurrounded with a beautiful grove, of a ſemicircular form, and extenſive and pleaſant meadows and gardens; and makes a most pictureſque and interesting appearance in the landſcape.

The most eminent men educated at this college are, Archbiſhops Cranmer, and Bancroft; Biſhop Bale, author of "Libri de Scriptoribus Britannicis;" Sir Thomas Elliot, author of a "Dictionary;" Christopher, Lord Hatton; Sir Richard Fanſhaw, Knt. John Flamstead, Regius Profeſſor of Astronomy; Fenton, the Poet; and John Worthington, D. D.

This college conſiſts of a Master, ſixteen Fellows, and forty-one Scholars and exhibitioners. The whole number of members in 1802 was 102. The Viſitor, is the Biſhop of Ely: who alſo appoints the Master.

CHRIST's COLLEGE

Was built on the ſite of an hostel called God's Houſe, which had originally been ſettled near Clare Hall, and endowed by William Bingham, for 24 Scholars, in 1442, but was removed hither by Henry VI. who intended to augment the number of Scholars to ſixty, but was prevented effecting his purpoſe by the enſuing civil wars. His maternal ſister, Margaret, Counteſs of Richmond, mother to Henry VII. obtained a licenſe from her ſon to complete what her half-brother had projected; and, in 1506, ſhe changed its name to Jeſus College. and endowed it for a Master and twelve Fellows. Some ſuperstitious objections having been made to this number, as alluding to Christ and the twelve Apostles, Edward VI. added another Fellowſhip; and two others have ſince been founded by Sir John Finch and Sir Thomas Baines. The endowments have been increaſed to maintain a Master, fifteen Fellows, and about ſeventy Scholars.

This college is ſituated in St. Andrew's Street. and is compoſed of one grand court uniformly, and handſomely caſed with stone, and ſaſhed; it is about 140 feet long, and 120 broad, containing the Chapel, Hall, Lodge, and ſeveral apartments for the students. Behind this court is a modern and uniform pile of building 150 feet in length, built with stone, commanding an extenſive view of the ſurrounding country. The front of this college to the street makes a noble appearance, being built with stone, with a grand tower-gateway at the entrance.

The Chapel is about 85 feet long, 27 broad, and 30 high; it is ornamented in a peculiarly neat and handſome manner, and floored with marble. On the north ſide of the altar is a beautiful monument of white marble, erected to record the memory and friendſhip of Sir John Finch and Sir Thomas Baines, who were educated together at this college. Sir John died at Conſtantinople, whither he had been ſent on an embaſſy. His body was brought to England, and interred here by his friend; who ſurvived but a ſhort period, and was buried in the ſame vault. In the east window are ſome well-executed whole-length portraits on glaſs of Henry VII. and other relations of Lady Margaret, the foundreſs, whoſe own likeneſs is alſo preſerved in this Chapel, by an ancient painting on board.

THE HALL is a beautiful room, 45 feet long, 27 broad, and 30 high; containing a good portrait of the foundreſs, kneeling. In the Combination-room is another portrait of the foundreſs, a half-length, on board.

The gardens of this college are pleaſant and well laid out; containing a good bowling-green, a neat Summer-houſe, and a cold-bath, ſurrounded with a little wilderneſs. In the garden is a large Mulberry-tree, that was planted by Milton, when a student here. The trunk is much decayed from its age; but ſome of the Scholars, with a degree of ſentiment which even a claſſic education will not always inſpire, have endeavoured to preſerve the tree from further harm, by covering the damaged parts with ſheet lead.

The following are enumerated as the most eminent perſonages educated at this college: John Leland, the celebrated antiquary; Biſhop Latimer, the Martyr, Richard Hall, author of the "Life of Biſhop Fiſher;" Arthur Hilderſham, a zealous Puritan; Dr. Seth Ward, one of the tranſlators of the Bible; Francis Quarles, author of the "Emblems;" the ſublime and immortal Poet, Milton; Dr. Thomas Burnett, author of the "Theory of the Earth, &c." Sir Robert Raymond, Lord Chief Juſtice; Echard, the Historian; and Dr. Paley, the celebrated author of the "Principles of Moral and Political Philoſophy."

The preſent ſociety conſiſts of a Master, fifteen Fellows, &c. The whole number of members in 1802 was 101. Viſitors, the Vice-Chancellor, and two ſenior Doctors; or, if the V. C. be of Christ's, the Provost of King's.

ST. JOHN's COLLEGE.

The ſame Lady Margaret who founded Chriſt's College, left by will, dated 1509, certain lands of the value of £400. per annum, together with the ſite of the diſſolved Priory of St. John, in Cambridge, and its revenue, amounting to £80. per annum. to her executors, in truſt for the building and endowment of a college. Previous to the execution of the neceſſary deeds, both the King and Lady Margaret died; and the bequests, above mentioned, being only annexed in a codicil to the will, and not officially ſealed, the lands were reſumed by Henry VIII. who alſo refuſed to conſent to the diſſolution of the hoſpital. The executors now applied to Pope Julius the Second; and, after conſiderable expenſe and embarraſſment, obtained a decretory bull, dated the 8th of July, 1510, which authoriſed them to diſſolve the old houſe, and eſtabliſh the new college. Thus privileged, they commenced the preſent ſtructure, which was completed in about four years, and in the year 1516, a Master and thirty-one Fellows were appointed. Theſe endowments have ſince been increaſed by numerous benefactions; and, at preſent, afford a maintenance for 61 Fellows, and 114 Scholars.

It is contended by ſome perſons (as mentioned in St. Peter's College) that this is the most ancient foundation in the Univerſity; as, in 1281, Hugh de Balſam procured a licenſe from Edward I. to convert the Hoſpital of St. John into a college for students; but this deſign being abandoned on the eſtabliſhment of St. Peter's, it remained in the poſſeſſion of the canons regular till nearly the end of the reign of Henry VII. when St. John's College, as deſcribed above, was founded.

This college, which is ſituated in Trumpington-street, just beyond Trinity, conſists of three courts, built principally with brick. The east, or entrance court, is ornamented with a ſpacious and magnificent portal, furniſhed with four towers; it is 228 feet long, by 216 broad, and has the Chapel on the north, and the Hall on the west; in the angle, between theſe buildings, is the entrance to the Master's Lodge; and on the ſouth is an elegant new building of stone, uniformly ſaſhed, and containing a number of excellent apartments. The centre court, which is entered through the ſcreens, is more extenſive than the former, meaſuring 270 feet in length, and 240 in breadth; being chiefly appropriated to the uſe of the fellows; excepting the principal floor on the north ſide, which forms a picture gallery, connected with the Lodge and Chapel on the east, and on the west with the Library; which occupies the north ſide of the third court. This court is built with brick; and, though ancient, its buildings are diſpoſed with great regularity, and exhibit an air of extreme neatneſs, not unmixed with veneration. The third court is entered by a noble portico, with a tower over it; on which is fitted up a convenient obſervatory; it is by far the ſmalleſt court of the three. On the north ſtands the Library, and on the west is a handſome piazza, with the ſtudents apartments over it. The back of this court over-hangs the river, and enjoys a delightful proſpect of the beautiful groves and gardens of the college.

This college ſuffered very ſeverely during the civil wars, being pillaged of many valuable articles, particularly a rich and extenſive collection of ſilver coins and medals: the communion-plate was alſo carried away; and the outer court converted into a priſon for the Royalists.

The Chapel has been lately repaired, and a new roof added. The interior is fitted up in a very neat and appropriate style, and ſeparated into two parts by the organ gallery. It is 120 feet long, and 27 broad. The altar is embelliſhed with a modern painting of *St. John preaching in the Wilderneſs*, by Robert Ker Porter, the ſame artist who executed the two popular pieces of the Storming of Seringapatam, and the Siege of Acre. The figure of St. John is commanding and beautiful, and the deep attention portrayed in the looks of his hearers, is extremely well executed.

The Hall is a good room, 60 feet by 30, handſomely fitted up with a Muſic-gallery over the entrance; and is embelliſhed with ſeveral good portraits; particularly a highly finiſhed likeneſs of the Lady Margaret; and a whole-length of Thomas Wentworth, Earl of Strafford, by I. Richardſon; alſo, a fine painting of Sir Ralph Hare, by M. Gerrard; with ſeveral others.

The Library was built by Archbiſhop Williams, and is a noble and ſpacious apartment; indeed, from its extent, and the number of volumes it contains, it has more the appearance of a Univerſity Library, than that of one college. One claſs was given by Prior, the Poet; conſisting principally of French books, particularly in history. The room is handſomely fitted up, and contains a great number of very valuable and ſcarce books. Here is alſo a ſingular curioſity; a leaden ſkull which belonged to a complete ſkeleton, found in Newport-Pagnel Church.

THE MASTER'S LODGE is extenſive and commodious; and contains a numerous aſſemblage of portraits, and a few other pieces. The following may be conſidered as the principal: *John Fiſher*, Biſhop of Rocheſter, half-length, by Hans Holbein; the Biſhop is repreſented in a gown and furs, in one hand is a ſtaff, in the other a glove, a ring on his finger is marked H. H. *Margaretta Mater Henrici VII*, a ſmall three quarter length, on board, and, together with another of this diſtinguiſhed Lady, preſerved here, must be conſidered extremely curious; both pieces repreſent her kneeling with her hands claſped, and a book before her; one of theſe appears to be an original; the other ſuppoſed to be by Holbein: *Robert Shirton*, the firſt maſter, and builder of the college, repreſented in a fur-cloak: *Queen Elizabeth*, on board: *Cecil, Lord Burleigh*, half-length, on board: *Mary, Queen of Scots*, Æt 20, dated 1561, half-length, on board: *Henry Wriotheſley*, Earl of Southampton, dreſſed in armour, with a rich ſhawl, finely worked: *Mary, Counteſs of Shrewſbury*, this portrait is more curious from its ſingularity than its goodneſs of execution; ſhe is repreſented in a vaſt fardingale, with a high ruff, and her dreſs ornamented with an abundance of jewels: *Peter Gunning*, Biſhop of Ely, delineated with a pleaſing and venerable countenance: *The Maſſacre of the Innocents*, apparently copied from Rubens; this is a very long picture, the drawing is correct and ſpirited, and the compoſition diſplays much judgment: *John Lake*, Biſhop of Chicheſter: *Lawrence Fogg*, Dean of Cheſter, half-length; very ſpirited: *Lucius Carly*, Lord Viſcount Falkland, half-length: *Thomas, Earl of Strafford*, in armour, from the original, by Vandyke: *Richard Neile*, Biſhop of Durham, ſmall, on board: *Edward Stillingfleet*, Biſhop of Worceſter, three-quarter length, by Mrs. Beale: *Mathew Prior*, the Poet and Stateſman, dreſſed in his Ambaſſador's robes, richly decorated: a ſmall Kitchen Scene, with the ſtory of *Martha* and *Mary* in the diſtance; this is a highly finiſhed picture, with rich and appropriate colouring:

Robert Heath, Lord Chief Juſtice of the Common Pleas; very expreſſive, and finely coloured: *Thomas Baker*, the celebrated antiquary, repreſented in his gown and band, with a thin studious face: *William Platt, Eſq.* a ſmall piece of conſiderable merit, on board. Moſt of theſe pictures, with a vaſt number of others of inferior merit, are diſpoſed in a noble and ſpacious gallery extending the whole length of the ſecond court. In an apartment of the Lodge, a curious ſet of chairs, ſaid to have been preſented to the ſociety by Charles II. are preſerved; one of them is a large elbow chair, ornamented with beautiful carvings of cherubs, Lions' heads, &c.

The walks and gardens of this college are particularly beautiful: over the river is a fine stone bridge of three arches, which connects the college with its walks—theſe are compoſed of a fine viſta and ſeveral pleaſant retired walks, encompaſſing the meadows, and planted with a number of very fine and venerable elms. Beyond theſe, at the extremity of the vista leading from the college, is the Fellows' garden; a large piece of ground laid out in a most tasteful and agreeable style, and containing a bowling-green and an elegant Summer-houſe.

Among the many eminent characters who have been educated at this college, beſides thoſe above-mentioned, are: Roger Aſcham, Preceptor to Queen Elizabeth; Biſhop Taylor, one of the Compilers of the *Liturgy*; Sir Thomas Wyatt, the elder; Cecil, Lord Burleigh; Dr. John Dee, the celebrated Mathematician; Biſhop Morgan, the first Tranſlator of the Bible into Welſh; Ben Johnſon, the famous Dramatist; Henry Brigges, a Mathematician, Ambroſe Phillips, author of the "Pastorals;" Biſhop Stillingfleet, whoſe works have been publiſhed in ſix volumes folio; Martyn Lister, an eminent Naturalist; John Smith, D. D. a remarkably erudite character; Thomas Otway, the celebrated, but unfortunate Poet; Hilkiah Bedford, author of the "Hereditary Right of the Crown aſſerted;" Francis Peck, Compiler of the "Deſiderata Curioſa;" William Lee, inventor of the ingenious machine for weaving stockings; Prior, the famous Poet and Stateſman; Thomas Stackhouſe, author of the "History of the Bible;" the late Marquis of Rockingham; and John Horne Tooke, Eſq.

The preſent ſociety conſists of a Master, 61 Fellows, and 114 Scholars. The whole number of members in 1802 was 465. Viſitor, the Biſhop of Ely.

MAGDALEN COLLEGE.

Occupies a portion of the ſite of an ancient priory; which was purchaſed by the aſſociated monks of Ely, Ramſey, and Walden. Some part of the buildings in which they reſided is still ſuppoſed to remain, in the ſouthern angle of the college. In the reign of Henry VIII. the monks diſpoſed of their poſſeſſions to Edward Stafford, Duke of Buckingham, who erected part of the preſent fabric, and intended to have endowed, and named it from his own title; but, being ſoon afterwards condemned to the Scaffold, by the artifices of Cardinal Wolſey, his deſigns were frustrated, and his poſſeſſions reverted to the Crown. In 1542 Thomas, Lord Audley, Chancellor of England obtained a grant of it from the King, and a charter of incorporation, which named it St. Mary Magdalen College. At the ſame time, he endowed it for a Master and four Fellows. The Fellowſhips have been ſince increaſed to ſeventeen, and ſeveral Scholarſhips have been added. The masterſhip is in the gift of the poſſeſſor of Audley End.

This is the only college on the north ſide of the river; being ſituated in that part of the town called Castle-End. It conſiſts of two courts: the firſt, next the ſtreet, which is the largeſt, is 3 feet long, and 78 broad; it is very neatly ſtuccoed and ſaſhed, and contains the Hall, Chapel, and Lodge; beſides other apartments. The back court is entered through a gate that has this inſcription: "*Garde ta foi*;" here is a neat building of ſtone containing the Bibliotheca Pepyſiana, the fellows' apartments, and a piazza in front.

THE CHAPEL is near 50 feet long, and 18 broad; it is fitted up in an exceedingly neat and handſome manner; and has a curious altar piece of plaſter of Paris, repreſenting the two Maries at the Sepulchre, after the reſurrection, in alto-relievo, by the ingenious Mr. Collins.

THE HALL is a very handſome room, 45 feet long, 18 broad, and 21 high; it is neatly wainſcotted and ornamented, with a muſic gallery at the ſouth end, leading to the Combination-room. The Hall contains tolerable good paintings, by Freeman, of Lord Audley; Edward Stafford, Duke of Buckingham; Lord Chief Juſtice, Sir Chriſtopher Wray, Knt. and Edward Rainbow, Biſhop of Carliſle; from originals: another of Biſhop Cumberland, by Romney; and a whole length of Henry Howard, Earl of Suffolk, by Gibſon.

THE MASTER'S LODGE contains the original portrait of the Duke of Buckingham, given to the college by Dr. B. Willis.

This college has two LIBRARIES; the principal of which was given by Samuel Pepys, Eſq. Secretary to the Admiralty in the time of Charles II. it contains many valuable publications, and alſo ſome curious manuſcripts relating to maritime affairs, collected and written by Mr. Pepys; who is ſometimes regarded as the founder of the preſent navy. Here are likewiſe ſeveral volumes of ſcarce and curious prints; among which are the twelve Cæſars and their wives from Titian, engraved by Sadlier; theſe are in fine preſervation. A large folio volume of various hand-writings from the year 900, exhibiting ſome curious ſpecimens of fine writing, and in the ſame book are ſome manuſcript imitations of printing, inimitably done. Here are many other valuable manuſcripts, and a unique collection of ancient ballads; to which both Dr. Percey and Pinkerton have had reference. In this Library are three portraits of Mr. Pepys; one of them a half-length, by Sir Peter Lely. On the outſide of the Library is this inſcription, "*Bibliotheca Pepyſiana.*" "*Mens cujuſque is eſt quiſque.*" The old College Library is well ſtored with many valuable and uſeful books.

With the diſtinguiſhed characters educated here, may be named, Henry, Lord Stafford, heir to the founder; Sir Orlando Bridgman, Chief Juſtice of the Common Pleas; Sir William Howell, author of the "Medulla Hiſtoriæ Anglicanæ; Biſhop Cumberland; Samuel Pepys; Daniel Waterland, Archdeacon of Middleſex; Sir Robert Sawyer, Attorney-General; Peter Peckard, late Dean of Peterborough; and Profeſſor Waring, the celebrated mathematician.

This ſociety conſiſts of a Maſter, and ſeventeen Fellows. The whole number of members in 1802 was 61. Viſitor, the Poſſeſſor of the eſtate of Audley End.

TRINITY COLLEGE.

This noble and magnificent eſtabliſhment occupies the ſite of ſeveral hoſtels, as well as of the two ancient ſocieties, St. Michael's and King's Halls. The former of theſe was founded by Harvey Aungier, of Stanton, in Suffolk, who was ſucceſſively Chief Baron of the Exchequer, Chief Juſtice of the Common Pleas, and Chief Juſtice of the King's Bench. King's Hall was endowed for a Master and thirty Fellows by Edward III. The diſſolution of religious houſes occaſioned great confuſion at Cambridge; and the students, fearing the general decay of learning, repreſented their fears to the King; who informed them that, ſo far from ſeeking the deſtruction of colleges, it was his intention to erect a magnificent one; and, as a preparatory meaſure, he required the ſurrender of the above eſtabliſhments. To the revenues of theſe houſes, Henry VIII. made great additions, and erected the preſent ſpacious college by charter, dated December 19, 1546, and dedicated it to the Holy and undivided Trinity. The endowments, given by Henry, were augmented by his daughter Mary; and the perſons now maintained on the eſtabliſhment are upwards of 400; *viz.* a Master, Vice Master, ſixty Fellows, ſixty-nine Scholars, three public Profeſſors, four Conducts, and various other officers and ſervants. The maſterſhip is in the abſolute appointment of the Crown.

Trinity College is ſituated between Trumpington-street, and the river; having St. John's on the north, and Caius on the ſouth: its buildings incloſe two ſpacious quadrangular courts. The first court, which is the largest, meaſures 334 feet by 325 west and east, and 287 by 256 north and ſouth. It is entered from the street by a magnificent tower gate-way, which is ornamented with a statue of Henry VIII. and a variety of carving; it had formerly an obſervatory on the ſummit, erected for the studies of the immortal Newton; but this was removed in the year 1797. On the north ſide of this court stands the Chapel, and a lofty tower with a clock in front, under which is a statue of Edward III. On the west is the Master's Lodge, the Hall, and Combination-rooms: the remainder of the court is occupied by the apartments of the Fellows and students. On the ſouth is a magnificent gate-way, with four lofty towers at the corners, adorned with a fine statue of Queen Elizabeth in her robes. In the ſouth-west corner of this court is a ſmall pile of building, called Biſhop's Hostel. In the middle of this ſuperb quadrangle stands an elegant octagonal conduit built with stone, which ſupplies the college, and its neighbouring inhabitants, with excellent water brought by a ſubterraneous channel from a ſpring about one mile west of the town. The *coup d'œil* of this ſplendid court is truly grand; its dimenſions are on the most extenſive ſcale, and its buildings not only astoniſh by their grandeur, but alſo delight, and relieve the eye, by their variety. It is ſaid that when the King of Denmark and his ſuit honoured the Univerſity with a viſit, they were introduced to this college in Neville's court, under the Library; which they concluded was the whole of the college; ſo that, in paſſing the ſcreens into the great court, they were struck with admiration at its ſplendour.

The inner court is entered through the ſcreens*; it is more regularly elegant, but leſs ſpacious than the former; its meaſurement being only 228 feet by 223, ſouth and north, and 148 feet by 132, west and east. This is generally called Neville's court, from the name of the perſon (Dr. Thomas Neville,) at whoſe expence it was principally formed, in the year 1609. Since that time a magnificent Library has been erected at the west end; and the ſouth and north ſides, which contain the students' apartments, have been almost wholly rebuilt in a uniform and elegant style, with ſpacious piazzas in the front: the east ſide is formed by the Hall; in the front of which is a terrace with a handſome balustrade and flight of steps.

THE CHAPEL, erected by the ſister Queens, Mary and

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* The ſcreens is the paſſage that separates the Hall from the Kitchen and Butteries.

Elizabeth, is a noble and elegant edifice, built in the Gothic ſtyle. The interior is 204 feet in length, 83 feet 8 inches broad, and about 44 feet high; and diſplays, in an unrivalled degree, genuine ſimplicity and taſte. The Anti-Chapel is ſeparated from the Choir, by a large Organ-gallery, of Norway Oak, ſupported by fluted columns of the Doric order, and beautifully carved. Over this is a noble and remarkably fine-toned organ. Here is alſo a very fine piece of ſtatuary, executed by Roubiliac. This is the figure of the great [*]NEWTON, in white marble. The Philoſopher is repreſented ſtanding on a pedeſtal, in a looſe gown, with a priſm in his hands, and his benignant countenance turned upwards, with a look of profound and abſtracted meditation. The drapery is graceful, and diſpoſed in the moſt natural and beautiful folds; and the caſt of features is extremely fine. On the pedeſtal is the inſcription, *Qui genus humanum ingenio ſuperavit*; importing, that he exceeded all men in wiſdom. This ſtatue was erected at the expence of Dr. Robert Smith; and has been deſcribed by a modern Poet in the following words:

Hark! where the organ, full and clear,
With loud Hosannahs charms the ear!
Behold, a prism within his hands,
Absorbed in thought great NEWTON stands!
Such was his brow, and look ſerene,
His ſerious gait, and muſing mean,
When, taught on eagle wings to fly,
He traced the wonders of the sky;
The chambers of the ſun explor'd,
Where tints of thousand hues were stor'd.

The Choir is uncommonly ſplendid: it is furniſhed on each ſide with very elegant ſtalls for the Fellows, with ſeats, below them, for the Scholars; and on each ſide the entrance are the ſeats of the Maſter and Vice-maſter; the stalls are beautifully carved and ornamented with fluted Corinthian pilaſters and a very rich cornice of Norway Oak. The altar-piece is embelliſhed with a fine painting of *St. Michael and the Devil*, by West. This is placed under a magnificent roof of Norway Oak, ſupported by Corinthian pillars: the pediment is richly carved, with flaming urns on the ſummit; and decorated with wreaths and flowers beautifully ſculptured. On each ſide the altar are two antique and curious pieces of painting; one repreſenting the figures of our Saviour and St. John the Baptiſt, and the other of the Virgin Mary and the mother of St. John; theſe are placed in niches, painted in perſpective, and are reckoned very fine. The ceiling of this elegant apartment is beautifully painted in blue and gold; and the floor is of black and white marble. No stranger ſhould omit viſiting this chapel during the evening ſervice; when they will be gratified with one of the most intereſting ſcenes the Univerſity affords: the Organ is played with much taste and ſkill, and the ſervice is well performed, as in a Cathedral, by ſinging-men and choriſters. Nor is the ear alone delighted—this elegant oratory is illuminated with an immenſe number of wax-lights; which, added to the regular ranges of students in their flowing white robes, have a most pleaſing and interesting effect. In the Anti-Chapel are alſo two finely executed busts; one of Daniel Locke, by Roubiliac; and of Dr. Hooper, by Rysbrack.

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[*] A beautiful and correct drawing of this celebrated statue has been taken by Mr. Harraden, Drawing Master, Cambridge; from which a fine print has been engraved; which may be had at the artist's house.

THE HALL is a noble and ſpacious building, with buttreſſes and pinnacles, and a bow window on each ſide of extraordinary depth. Its extreme length is upwards of 100 feet, its breadth 40, and its height about 50. It is aſcended by a large flight of ſteps; and within is handſomely fitted up with carved wainſcotting, a lofty cupola, and a curious ceiling of open worked timber: it has alſo a very large muſic-gallery over the ſcreens. This apartment is decorated with ſeveral whole length portraits of perſons who have been of the college. The under-written are thoſe which moſt deſerve attention: *Dr. Robert Smith*, by J. Freeman; *William, Lord Ruſſel*, by J. N. Horne; *John Dryden*, by J. Hudſon; *Abraham Cowley*, by Stephen Slaughton; *Henry Spelman, Eſq.* by J. N. Horne, very excellent; *John Ray*, and *Richard Bentley*, by Hudſon; here is alſo a portrait, of Sir Iſaac Newton.

The Combination Rooms have been newly built in a very elegant ſtyle; and are a ſpecimen of the manner in which it was intended to erect the whole court. Here are two combination-rooms, one of which is a handſome ſquare apartment; the moſt ſpacious one, which is uſed on particular occaſions is fitted up in a very elegant manner, with handſome ſtuccoed walls and ceilings; it is ornamented with the following portraits, ſplendidly framed; *Charles Seymour* Duke of Somerſet, and Chancellor of the Univerſity, a finely executed picture, by Dance; *John* Marquis of Granby, leaning on his horſe, attended by a black groom, a moſt capital painting, by Sir Joſhua Reynolds; an original portrait of *Sir Iſaac Newton*; and a good whole length portrait of *Prince William of Glouceſter*, who was alſo a ſtudent of this college, by Romney. Here is alſo a fine buſt of *Dr. Richard Hooper*, over the door.

The Library, which occupies the weſt end of Nevile's court, is a moſt ſuperb ſtructure. The building was projected by Dr. Iſaac Barrow; and the ſubſcriptions, with which it was erected, amounting to nearly £20,000. were chiefly collected through his exertions. The architect was the great Sir Chriſtopher Wren. The outſide of this magnificent edifice is richly ornamented with pilaſters, carved chapitres, and architraves; with a ſtone baluſtrade ſurrounding the ſummit. Over the eaſtern front are four ſtatues, intended to repreſent Divinity, Law, Phyſic, and Mathematics; but they are certainly far more worthy of praiſe for the excellence of their workmanſhip, than the propriety of their perſonifications: they were executed by Mr. Gabriel Cibber;

who became ſo deſervedly famous for his admirable figures of raging and melancholy madneſs, on the gates of Bedlam. Under the Library is a grand and ſpacious piazza, ſupported by numerous pillars, and opening towards the walks with three noble gates of wrought iron; the front next the court is adorned with a range of Doric columns; the upper parts of the arches are all filled up, and ornamented with rich ſculpture; in the centre one is a fine bas-relief of Ptolamy, receiving the New Verſion of the ſcriptures from the ſeventy interpreters. Over the Doric is a range of elegant Ionic columns. The front towards the walks is very handſome; but leſs ornamented than the other. The entrance to the library is at the north end of the piazza, by an elegant ſtaircaſe with ſteps of black marble, and wainſcotted with cedar. Here is placed a curious collection of various ancient ſtones with inſcriptions; given by Sir John Cotton; a tablet fixed to the wall has a Latin inſcription to the following import: "Theſe Roman monuments, collected from every quarter of the northern part of England by the eminent antiquary, Sir Robert Cotton, and depoſited at his ſeat of Connington, in Huntingdonſhire, were removed hither in the year 1750, at the expence of Sir John Cotton, of Stratton, Bart." The famous Sigeum inſcription, bequeathed to the ſociety by Edward Wortley Montague, is preſerved with theſe rarities, together with a buſt of that eccentric character, executed at the expence of his daughter Mary, Counteſs of Bute, by Scheemaker. Here is likewiſe an ancient ſtone, with a Greek inſcription, brought from Archipelago, and lately preſented to the college by Mr. Hawkins, of Cornwall; aud a roman mile-ſtone, given by Richard Gough, Eſq. On the landing place is an original painting of *Sir Iſaac Newton*, who is portrayed in a looſe gown, with one hand in his boſom, and the other on a book, which is lying before him on a table, with this inſcription:

> "Nature and nature's laws lay hid in night,
> "God ſaid, let Newton be, and all was light!"

This was painted by Valentine Ritz, and poſſeſſes great merit. The Library is entered through folding doors at the north end; whence, the elegance and grandeur of the room burſts upon the eye in full luſtre. The length of this ſplendid repoſitory, which is probably unequalled by any apartment appropriated to a ſimilar purpoſe in Europe, is 200 feet, the breadth 40, and the height 38. The ſouth end is terminated by folding doors, opening to a balcony; over which is a fine window of painted glaſs, for the performance of which £500 was bequeathed by Dr. Robert Smith, late Maſter. The window was painted by Mr. Peckett, of York, from a deſign of Cipriani. The ſubject repreſents the preſentation of Sir Iſaac Newton to his Majeſty, George the Third, who is ſeated under a canopy, with a laurel chaplet in his hand, and attended by the Britiſh Minerva, who is apparently adviſing him to reward merit in the perſon of the great Philoſopher. Below the throne is the Lord Chancellor Bacon, in his robes, with a pen and book, as if preparing to regiſter the reward about to be beſtowed on Sir Iſaac. The original, which coſt 100 guineas, is preſerved in the Library. It muſt be allowed the incongruity of the deſign is as abſurd as could well be imagined; but the artiſt being a foreigner, may in ſome degree ſtand excuſed for that ignorance of Engliſh hiſtory, diſplayed by the introduction of three characters, who never were contemporaries, into one picture. This magnificent apartment is floored with marble, and ornamented at each end with veined marble pedeſtals, ſupporting the buſts of Ray, Willoughby, Bacon, and Newton, finely executed by Roubiliac. The walls are of ſtucco, ornamented with Corinthian pilaſters and a rich cornice; and the Library is divided into thirty ſpacious claſſes, diſpoſed in caſes of oak, elegantly carved: on the top of each caſe is a well executed marble buſt of ſome diſtinguiſhed literary character; in the choice of which no undue preference is given to any age, but a judicious ſelection made of all the moſt eminent authors, both ancient and modern: In a niche, at the ſouth end, is a fine ſtatue of Charles Seymour, Duke of Somerſet, by Ryſbrack.

Among the portraits in the Library, whoſe merit entitles them to notice, are whole-lengths, by Valentine Ritts, of Dr. Iſaac Barrow; Dr. Neville; Sir Henry Puckering; and Monk, Duke of Albermarle, in his robes, as Knight of the Garter; and Charles Montague, Earl of Haliſax, by Sir Godfrey Kneller. Here is alſo an original half-length of *Shakeſpeare*, by Mark Garrard. The books are both valuable and numerous, the collection having been frequently augmented by the gifts of different benefactors. Some very curious and interesting manuſcripts are alſo contained in this apartment; particularly a thin folio, enriched with a variety of pieces in the hand-writing of Milton: they conſiſt of the original copy of the Maſque of *Comus*; two draughts of a letter to a friend who had importuned him to enter into orders; ſeveral plans of *Paradiſe Loſt*, compoſed at the period when he intended to have made that ſubject the ground-work of a tragedy; ſketches of ſeveral other tragedies from Scripture; and ſeveral ſmaller pieces, all written in the bard's own hand.

A great number of very intereſting and valuable curioſities are preſerved in this Library; of which, the following are enumerated as the principal. In the phyſical claſs, at the ſouth end, is a curious antique ſtatue of *Æſculapius*, found at Samœ, near the river called Speculum Dianæ, about fourteen miles from Rome, and given to the ſociety by Sir Charles Wintringham, Bart. M. D. Here are alſo, the globe, univerſal ring dial, quadrant, and compaſs, which formerly belonged to Sir Iſaac Newton, and a lock of his hair; a quiver of arrows, employed by Richard III. againſt Henry VII. at the battle of Boſworth Field; a Chineſe Pagod; a beautiful ſkeleton of a man in miniature, cut by a Shepherd's boy; the largeſt Lizard ever ſeen in England, with many other curious animals, in ſpirits; a ſtone taken from the wife of a lockſmith, at St. Edmunds Bury, and which originally weighed upwards of thirty-three ounces and three pennyweights, but was broken into two, to gratify the curioſity of Charles II. when at Newmarket, who deſired to ſee if it was formed like other ſtones; an Egyptian Mummy, in very fine preſervation, the outſide being curiouſly gilt and painted; an Ibis; and the dried body of one of the aboriginal inhabitants of the Madeira Iſlands, in appearance like dried Seal-ſkin, the countenance is ſhrivelled, and the features thrown into the moſt horrible diſtortion, the whole figure is much ſhrunk every way, and of a duſky brown color; this, with the Mummy and Ibis, were preſented to the college by the late Earl of Sandwich, with many other varieties brought by himſelf, from the newly diſcovered Iſlands in the ſouth Seas. Here is likewiſe, a copy of King John's *Magna Charta;* a copy of a letter of indulgence from Pope Clement XII. a ſtuffed Zebra; a large collection of curioſities brought by Captain Cook, from Otaheite; plans of the celebrated churches of St. Peter's at Rome, St. Sophia at Conſtantinople, Cathedral at Florence, Pantheon at Rome, and St. Paul's at London, theſe are all repreſented on one ſmall plate, but plainly ſhew the comparative ſizes of theſe grand edifices; and ſkeletons of a man and a monkey, called *Comparative Anatomy.* We take our leave of this grand apartment with obſerving, that it diſplays throughout ſuch taſte, elegance, and chaſteneſs of decoration, as rank it one of the firſt galleries in Europe. The Library at Dublin is ſaid to exceed it as to exterior; but within, is divided into two rooms, which conſiderably diminiſhes the effect.

THE MASTER'S LODGE is an extenſive and elegant modern ſtone building, containing a great many very grand and ſpacious apartments; particularly the ſuit called the royal apartments, which are extremely ſplendid, and where the Sovereign reſides whenever he viſits Cambridge. The Judges alſo take up their reſidence here, when on their circuit. The apartments in this building contain a numerous collection of portraits; of which, the following may be conſidered as the moſt eminent: *Robert Devereux*, Earl of Eſſex, half-length, by Mark Garrard; *Queen Elizabeth*, in a ruff, immenſe ſleeves, and a flowered petticoat, the whole dreſs richly ornamented with lace; *Edward III.* a curious old painting; *Sir Walter Raleigh*, a ſmall head; *Robert Cecil*, Earl of Saliſbury; *Henry VIII.* a large picture, by Lucas de Heere; the figure of the King is between nine and ten feet high, and the limbs proportionably gigantic; it is highly finiſhed, and in good preſervation; *Edward VI.* on board, well executed; *Thomas Neville*, Dean of Canterbury, half-length; *Scaliger*, byPaul Veroneſe, given to the college by Dr. Bentley; *Queen Mary*, on board; *Sir Iſaac Newton*, half-length, by Vanderbank; *Stephen Whiſſon*, by Vander Myn; *Dr. Manſel*, the preſent Maſter. Here is alſo a buſt of *Galileo*, by Carcini; and in the centre of the Hall a beautiful ſtatue of *Edward VI.* in plaſter of Paris; both preſented to the ſociety by Dr. Robert Smith, late Maſter.

From the Piazza of the Library, we enter the beautiful and juſtly admired walks of the college, which are about one third of a mile in circumference. At the front of the Library runs the ſerpentine Cam, over which, is an elegant Cycloidical ſtone bridge of three arches, deſigned and executed by the late Mr. James Eſſex, F. S. A. This leads to the walks, which are ſkirted with cheſnut and lime trees, ſurrounding meadows. The viſta of the centre walk is particularly beautiful, from the limes having ſoared to a great height, and at the interſection of their branches aſſumed the ſhape of a Gothic arch.

This college has had the honour of educating ſome of the moſt diſtinguiſhed characters of Great Britain: Foremoſt on the illuſtrious catalogue ſtands the name of our immortal Philoſopher, Sir Iſaac Newton: and amongſt thoſe who have become more eminently celebrated, are, Sir Francis Bacon, Lord Verulam; Lord Chief Juſtice, Sir Edward Coke: Fulke Greville, Lord Broke; Robert Devereux, Earl of Eſſex; Sir Robert Filmer, author of the "Patriarcha;" the Poet, Cowley; Sir Robert Cotton, founder of the *Cottonian Library*; Sir Henry Spelman, author of the "Gloſſary;" Biſhop Wilkins, author of the "Univerſal Character;" John Ray, and Francis Willoughby, the celebrated Naturaliſts; Dr. Thomas Gale, an eminent antiquary; Roger Cotes, an eminent Mathematician, and author of "Harmonia Menſurarum;" Nathaniel Lee, the dramatiſt; Andrew Marvell, Eſq. the Poet and Stateſman: the Poet Dryden: Dr Iſaac Barrow; Dr. Richard Bentley; Dr. Conyers Middleton; the preſent Biſhop of Landaff; Prince William Frederick of Glouceſter; the preſent Duke of Rutland; Earl Spencer; and a numerous liſt of noblemen and church Dignitaries.

This royal foundation conſiſts of a maſter, 60 fellows, 3 conducts, and 69 ſcholars. The whole number of members in 1802 was 548. Viſitors, the Biſhop of Ely, to the maſter; the King, to the fellows.

EMMANUEL COLLEGE.

Was erected on the ſite of a Dominican Friary; founded about the year 1280, by ſome private perſons; and afterwards augmented by Alice, widow of Robert Vere, ſecond Earl of Oxford. On the diſſolution, it was granted to Edward Ebrington, and Humphrey Metcalfe; of whoſe heirs it was purchaſed by Sir Walter Mildmay. This gentleman was Chancellor of the Exchequer, and Privy Counſellor to Queen Elizabeth; of whom he obtained a charter of incorporation for this college, in the year 1584, and endowed it for the maintenance of a master, 3 fellows, and 4 ſcholars. Since that period the revenues have been enlarged by various donations; and the perſons now ſupported by them are 15 fellows, and nearly 100 ſcholars and exhibitionists.

This college is pleaſantly ſituated at the ſouth-east entrance of the town. The front next the street is of great extent, elegantly built with stone, with a pediment in the centre, ſupported by four columns of the Ionic order; under which we paſs, through a ſpacious piazza, into the principal court; which consists of the Cloisters and Gallery, the Hall, the Combination-room, the Master's Lodge, and a modern and uniform structure of stone, ornamented with a baluſtrade and parapet.

The Chapel, which is entered from the eastern piazza of the court, is a handſome stone building 84 feet long, 30 broad, and 27 high; the interior is extremely elegant, with a marble flooring, and the ceiling tastefully ornamented with stucco work. The altar piece is adorned with a fine painting of the *Prodigal Son*, by Ammiconi, and at the west end is a handſome gallery, containing a neat organ.

The Hall is a very noble room, embelliſhed with a muſic gallery, a beautiful stuccoed ceiling, and two grand bow windows, oppoſite each other, at the upper end. Here is a very fine painting of Sir Wolstan Dixie, Knt. the founder of two bye-fellowſhips and two ſcholarſhips. The Combination room, which joins the Hall, is handſomely fitted up; and contains a good portrait of Mr. Hubbard, late fellow of the college, and registrar of the univerſity.

The Library, ſituated in a ſmall back court, is a good apartment, containing a well choſen collection of books, many of which are ſcarce and valuable; particularly a copy of *Tully's Offices*, printed by Fauſt, in 1465, which formerly belonged to Prince Arthur, brother of Henry VIII. whoſe arms are portrayed in the title page. This is extremely curious, and in fine preſervation.

THE MASTER'S LODGE is commodious, and handſomely fitted up; and contains an extenſive Picture-gallery; which, with the other apartments, contains ſeveral portraits: the following appear to be the moſt curious: *Sir Walter Mildmay*, the founder, with theſe words on it: " by Vanſomer, ætat. ſuæ 66, Anno. Dom. 1558." *Sir Anthony Mildmay, Knt.* the dreſs is very ſingular; *Thomas Holbeach, D. D.* in a ſurplice and hood, with his arms, full length; *Archbiſhop Sancroft*, ſitting at a writiting-table, with his arms and motto, *Rapido contrarius Orbi*; by P. R. Sens; *Mr. Francis Aſh*, a benefactor, half-length, by Dobſon; *Rodolph Symonds*, half-length, a curious painting; *John Fane*, Earl of Weſtmoreland, by Romney; *Dr. Richard Farmer*, the late Maſter, by Romney; *Dr. Parr*, a copy, but well executed; *Charles Jackſon*, Biſhop of Kildare, by Gainſborough; *Sir William Temple*, ſaid to be by Sir Peter Lely; and *Mr. Hubbard*, by Gainſborough.

The gardens are pleaſant and extenſive; and contain a neat bowling-green, and a cold-bath. In the Fellows' garden is a curious and beautiful young Cedar of Labanon. The whole of this college diſplays an air of elegance and taſte, exceeded by few in the Univerſity.

The moſt diſtinguiſhed characters of this college, are as follow: Biſhop Hall, one of the Commiſſioners ſent by James I. to the Synod of Dordt; Richard Kidder, Biſhop of Bath and Wells, killed in his bed, in 1763, by the fall of a ſtack of chimnies at his Palace, at Wells; Joſhua Barnes, editor of *Euripides* and *Anacreon*; Sir Robert Twiſden, Bart. an antiquary; Sir William Temple; Matthew Poole, author of the

"Annotations on the Old and New Teſtaments;" Sir Francis Pemberton, Chief Juſtice of the King's Bench; John Wallis, the Mathematician; Anthony Blackwall, author of the "Defence of the Sacred Claſſics;" and the late Dr. Richard Farmer, the Commentator on Shakeſpeare.

This ſociety conſists of a master, 15 fellows, and 50 ſcholars, beſides a number of exhibitionists. The whole number of members in 1802 was 144. The Viſitors are, in ſome caſes, the Vice Chancellor, and two ſenior doctors in Divinity; in others, the master of Christ's, and the two ſenior Doctors.

SIDNEY-SUSSEX COLLEGE

Was built on the ſite of a monaſtery of Franciſcans, or Grey Friars; on the ſuppreſſion of which, it was granted by Henry VIII. to the Maſter and Fellows of Trinity College, of whom it was purchaſed by the executors of Frances Sidney, Counteſs of Suſſex, and widow to Thomas Radcliffe, third Earl of Suſſex. This Lady, by will, dated December the 6th, 1588, bequeathed £5000. and ſome other property, to found a college for a Maſter, ten Fellows, and twenty Scholars; but the bequeſt being inſufficient to defray the coſt of the buildings, and ſupport ſo great an eſtabliſhment, the Fellows were reduced by her executors to ſeven; but have ſince been increaſed by additional endowments to the number originally intended. The firſt ſtone of the college was laid on the 20th of May, 1596, and the building completed in three years.

This college is ſituated on the eaſt ſide of Bridge-ſtreet, at the corner of Jeſus-lane; its buildings, which are neatly erected with brick; incloſe two ſmall courts.

THE CHAPEL (originally the friars' dormitory) has been elegantly rebuilt; and is 57 feet long, and 24 broad. This apartment, though ſmall, is particularly neat, and reflects great credit on the taſte and judgment of Dr. Elliſton, the preſent Maſter, under whoſe direction it was erected, and who was his own architect. The altar-piece is ſometimes called the nativity; but is evidently a *Repoſe during the Flight into Egypt:* it was executed by Pittoni, a Venetian; and repreſents the Virgin with the infant Saviour in her arms reclining on ſome looſe ſtraw; on the right is Joſeph ſleeping; in the clouds, in the upper part, are ſeveral cherubs, one of whom bears a fillet, on which an inſcription, explanatory of the ſubject, is ſuppoſed to have been written; but this was obliterated by the damage the painting ſuſtained, through the ſhip being leaky, in which it was brought from Venice. Both the compoſition and coloring are extremely fine. At the oppoſite end of the Chapel, is a neat gallery for the Maſter's family.

THE HALL is a very elegant room, with a Muſic-gallery, ſupported by pillars, forming a veſtibule at the entrance; and a handſome bow-window at the upper end. The ceiling and walls are beautifully ornamented with fret-work. Its dimenſions are 60 feet in length, 27 broad, and of a proportionable height.

THE LIBRARY, which is conveniently contrived as a ſtudy to the Maſter's Lodge, is neatly fitted up, with a well-choſen collection of books. It contains ſeveral curioſities; among which is part of an incruſtation of a child's ſkull, found in the iſle of Crete, about ten feet beneath the ſoil, and brought to England in the year 1627. The teeth are white, and ſound, and remain unchanged; but the other parts reſemble a hard ſand-ſtone. It was ſent up for the inſpection of King Charles I. by his Majeſty's deſire; and was then whole; but it has been ſince broken, and ſome parts loſt. Here is likewiſe a buſt of *Cromwell,* executed by the celebrated

Bernini, from a plaſter impreſſion, taken from Oliver's face after his death, and ſent to Italy. The countenance bears a great reſemblance to the portrait, by Cooper, but has been abſurdly colored, and rendered diſguſting and hideous, by the introduction of glaſs eyes. Theſe the good taſte of Dr. Elliſton has determined to have removed, as well as the glaring tints that overſpread the features. The buſt was preſented to the college by the Rev. Thomas Martyn, Regius Profeſſor of Botany.

THE MASTER'S LODGE conſiſts of ſeveral convenient and handſome apartments. Among other portraits, it contains an original, in crayons, of *Oliver Cromwell*, by Cooper; this is eſteemed a very correct likeneſs, and has been frequently copied; alſo, a full-length of *Lady Sidney*, the foundreſs; a good head of *Dr. Hay*; a whole-length of *William Wollaſton*, author of the "Religion of Nature;" and ſix excellent views of *Venice*, by Gwediyr, a pupil of Canaletti.

The grounds belonging to this college are laid out with extreme taſte. In the Fellows' garden is a ſpacious bowling-green, a pleaſant Summer-houſe, and a ſhrubbery.

Among the moſt eminent perſons who have belonged to this college, are the following: Oliver Cromwell, the Protector; Biſhop Seth Ward; Charles Alleyn, author of Poems, &c. William Wollaſton, author of the "Religion of Nature;" Sir Robert Atkins, Chief Baron of the Exchequer; Sir Robert Leſtrange; Thomas Comber, author of a "Vindication of the Divine Right of Tythes;" and Richard Reynolds, Biſhop of Lincoln.

The preſent ſociety conſiſts of a Maſter, 12 Fellows, &c.

The whole number of members in 1802 was 53. The Viſitor is unknown.*

DOWNING COLLEGE

We have enumerated all the colleges at preſent eſtabliſhed at Cambridge; but a new one is ſhortly intended to be erected, by the name of *Downing College,* in purſuance of the will of Sir George Downing, Bart. This Gentleman, in the year 1717, deviſed ſeveral valuable estates, in the counties of Cambridge, Bedford, and Suffolk, to his nearest relations, Sir Jacob Downing and his three ſons; with remainder to their iſſue in ſucceſſion, and in caſe they all died without iſſue, he deviſed the estates to trustees, who, with the approbation of the Archbiſhops of Canterbury and York, and the Masters of St. John's and Clare Hall, were to found a college within the precincts of this Univerſity, to be called *Downing College.* The testator died in the year 1749, and his property deſcended to Sir Jacob, who, on the death of his ſons without iſſue, in his life-time, became the ſole inheritor, and at his deceaſe, in 1764, bequeathed his poſſeſſions to his lady; but the estates, deviſed by Sir George Downing, were claimed by the Univerſity for the uſe of the propoſed college.

The validity of the original will, immediately became a ſubject of legal inquiry; but, after many years litigation, was at length eſtabliſhed; and the charter for the incorporation of the new college, having been fully examined by the Privy Council, and approved by his Majesty, the great Seal was affixed to it by the Lord Chancellor, Loughborough, on the 22d of September, 1800. This college is to conſist of a Master, a profeſſor of the laws of England, a profeſſor of Medicine, and ſixteen Fellows: ſcholars and pupils to be admitted and educated, as in other colleges. The Fellows are to vacate their fellowſhips at the expiration of *twelve* years, unleſs under particular circumstances they obtain a licenſe to hold them for a longer term. The Master, the Profeſſors, and *three* of the Fellows, are named in the charter; the remaining Fellows are to be appointed by the King's ſign manual, when the college is built. An open piece of ground on the ſouth-east ſide of the town, between Emmanuel and Pembroke, and near the Botanic Garden, called the *Leas*, is the ſituation choſen by the trustees for the new foundation.

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* All eleemoſynary corporations have by law a viſitor, where the founder has not appointed one, his heir is viſitor: upon failure of the heirs of the founder, it devolves to the Crown, and the Lord Chancellor is visitor.

We have now concluded our account of this celebrated ſeat of learning and the muſes; in which we have with the greatest poſſible correctneſs, noticed and deſcribed every object deſerving of particular obſervation. It may be thought that, in many of our deſcriptions, we have been too minute and prolix: but let it be remembered, that the most trifling object which boasts affinity with genius, poſſeſſes a powerful claim to notice; and this Univerſity has been rendered illustrious, by the many eminent and distinguiſhed characters it has reared; as well as by the ſacredneſs and incalculable utility of its institution. It can boast, with honest pride, the great and philoſophic diſcoveries of the immortal *Newton*; the ſublime and heaven-inſpired poetry of the incomparable *Milton*; the deep investigations of the great *Bacon*; and the energetic melody of the enthuſiastic *Gray*. It has produced the most exalted martyrs; the most celebrated divines, philoſophers, orators, and poets; with all that can charm the ear, enlighten the understanding, or improve the mind. It has attained its dignified station by progreſſive genius and virtue, encouraged by the munificence of the opulent and great.—Theſe lines of *Thomſon* appear too applicable to be omitted:

> What public works appear'd, what arts aroſe!
> What various ſcience ſhone, what genius glow'd!

With the ſincereſt wiſhes for the welfare and proſperity of ALMA MATER, we leave her ſacred ſhades: and may the dignity ſhe has attained, be preſerved by learning and virtue, ſhining forth the glory and the boaſt of Great Britain! Farewell ennobled bleſt retreat! we leave you, with the following appropriate lines:

> Ye floods! deſcend! ye winds! confirming, blow!
> Nor outward tempeſt, nor corroſive time,
> Nought but the felon undermining hand
> Of dark corruption, can its frame diſſolve,
> And lay the toil of ages in the duſt.

THOMSON.

THE

TOWN OF CAMBRIDGE.

CAMBRIDGE derives its name from the river *Cam*, or *Grant*, (for in hiſtory it is called both *Cambridge* and *Grantbridge*) and the bridge over it. It is ſituated in 52. 13. degrees north latitude, and 52 miles north of London. Its antiquity (as obſerved in the *Origin of the Univerſity*) has been a theme fruitful of diſputation.

That Cambridge was a Britiſh ſettlement is extremely probable; and the high artificial hill within the bounds of the intrenchments, near the caſtle, is by many perſons ſuppoſed to be a ſpecimen of Britiſh labor. But however this may be, that it was a Roman ſtation ſeems certain. "The ſite of the Roman *Granta*," ſays Stukely, "is very traceable on the ſide of Cambridge towards the caſtle, on the north weſt ſide of the river, of an irregular figure, containing thirty acres, ſurrounded by a deep ditch, great part of which yet remains on the ſouth weſt, and in the grounds behind Magdalen College." The ditch is at this time nearly filled up, but the banks may in ſeveral places be diſcovered. The Roman agger in the garden of Magdalen College is in very excellent preſervation, and has been converted into a fine terrace for the exerciſe of the Fellows. Within the works, which include the north-west end of the town, are the remains of three conſiderable baſtions, raiſed by order of Cromwell: the gate-way of the Castle, now uſed as the county priſon, and the churches of St. Giles and St. Peter. The latter was repaired ſome years ſince, and ſeveral Roman bricks were found in the decayed walls. Various fragments of urns, many Roman coins, and other relics have been diſcovered, at different times, in digging.

There is however no doubt that Cambridge was anciently a large and populous city; and once extended from the castle of *Grantcheſter* (now a ſmall village two miles ſouth-west of the town) to the castle of Chesterton, three miles in length, along the western bank of the Cam. This city was divided into four parts, by two streets croſſing each other at right angles. The principal street ran in the ſame direction as thoſe of modern Cambridge, the road being continued from the foot of Gogmagog-Hills, paſſed the Cam by a ford (now the Great bridge,) and continued in a straight line to Godmanchester; the road which croſſed it paſſed through the city from S. W. to N. E. towards Ely. Theſe coincidences are too evident to need other proof of this town being the Roman *Granta*.

In the year 1010, this town was plundered and destroyed with fire, by the Danes, but had in ſome degree recovered its ſplendor at the period of the ſurvey, in the reign of William I. It then contained 375 houſes; 27 of which were ſhortly after removed, to make room for the castle erected by the Conqueror.

In the reign of William Rufus, the town and county of Cambridge were ravaged with fire and ſword, by Roger de Montgomery; in revenge for an affront given him by the King. In the year 1174, the town was conſumed by fire; most of the churches, as well as the houſes, were then of wood, and were partly burnt: Trinity Church was entirely destroyed. The town alſo ſuffered frequent plunders; by which means, the proſperity of the Univerſity was at times depreſſed, and again revived; till, at length, the acceſſion of Elizabeth restored permanent peace to the Univerſity, which ſhe honored with a viſit. In the year 1381, a ſerious diſpute aroſe between the townſmen and the Univerſity. The townſpeople aſſembled at their Hall; and, having choſen John Grantceter as their leader, they committed the most flagrant acts of violence; carrying away the charters and other papers of the Univerſity: they proceeded to the houſe of the Chancellor. and obliged him to renounce, under pain of death, all the privileges that had ever been granted them. After this, they broke open the Univerſity chest in St. Mary's Church, and, taking out all the records, burnt them, with the other papers, in the market-place. Many other acts of violence accompanied theſe proceedings; and the miſguided crowd, to enſure their own ſafety, forced the officers of the Univerſity to ſign a bond, which vested its *entire* future government in the burgeſſes of the town; and contained an acquittance from all actions which might be brought against them, on account of the preſent tumults. Soon afterwards this uſurped power was wrested from their hands by Henry Spencer, Biſhop of Norwich, who entered with ſome Soldiers. Several of the principal leaders were impriſoned during life; the Mayor was deprived of his office; and the liberties of the town were declared forfeited, and bestowed on the Vice-Chancellor; in whom they remained till the reign of Henry VIII. when the Corporation was restored; but ſeveral of its former privileges have been retained by the Univerſity.

In 1630, this town was infected by a dreadful plague, which occaſioned the buſineſs of the Univerſity to be ſuſpended; all the students having liberty to retire to their reſpective homes. The number of perſons who fell victims to its ravages, amounted to between 3 and 4 hundred. During the continuance of the malady, the aſſizes were removed to Royſton.

MODERN CAMBRIDGE is ſituated nearly on a level: its extent is about one mile north and ſouth, and half a mile weſt and eaſt, in the broadeſt part; being nearly in an oval form, diminiſhing at each extremity. It is divided by the river into two parts, though far the greater part of the town is on the ſouth of the river. The entrance from London is by Trumpington-ſtreet, the north end of which is called St. John's-lane, where it joins Bridge-ſtreet; this ſtreet extends, in nearly a ſtraight line, the whole length of the town, croſſing the river by a ſtone-bridge of one arch, the ſouth-eaſt end being denominated St. Andrew's-ſtreet. (See the plan at the beginning of the Guide.

The general appearance of the town of Cambridge (independent of the Univerſity) is by no means ſo good as might be expected. The ſtreets are narrow and winding, and the houſes (with the exception of thoſe in the market place, and the ſtreets contiguous) are, in general, ancient, ill-built, and crowded cloſely together. The town was firſt paved in the reign of Henry VIII, who cauſed it to be enacted by Parliament, that all perſons who had any houſes, lands, &c. in Cambridge, bordering on the high ways, ſhould pave them to the middle of the ſaid ways, "in length as their grounds do extend," and alſo keep them in repair, under the penalty of *Sixpence* for every ſquare yard. This regulation being but little obſerved after the lapſe of two centuries, a new act was paſſed, in the year 1787, for "the better paving, cleanſing, and lighting the town, and widening the ſtreets, lanes, &c." Many improvements, in each of theſe reſpects, have ſince been effected; and the town may at leaſt boaſt of neatneſs, and convenience, if not of elegance: and the latter is exhibited in a high degree in the appearance of the Univerſity; which makes, as it were, a part of the town, and amply compenſates for any defects ſhewn therein.

The population of Cambridge is very conſiderable; the town conſiſts of fourteen pariſhes, which are as follow; the number of inhabitants, as returned on 10th of March, 1801, being annexed to each:

St Peter's -	392	St Edward's -	664
St. Giles's -	916	St. Benedict's -	650
St. Clement's -	651	St. Botolph's -	645
St. Sepulchre's -	479	St. Mary, the Leſs	555
All Saints -	704	Trinity -	1214
St. Michael's -	310	St. Andrew, the Great	1082
St. Mary, the Great	759	St. Andrew, the Leſs	252

9273

(Of theſe 4162 were males, and 5111 females).

Members of the Univerſity, - - 811

10,084

The corporation conſiſts of a Mayor, High-Steward, Recorder, twelve Aldermen, twenty-four Common Council-Men, four Bailiffs, a Town-Clerk, and other Officers. The Mayor, on the day of his election, has the privilege of beſtowing the freedom on any one perſon he may think proper. The choice of ſending Repreſentatives to Parliament is veſted in the Mayor, Bailiffs, and Freemen, not receiving alms: the voters are about 200. The Mayor on his election takes an oath, to obſerve and maintain the privileges of the Univerſity. The police of the town is extremely judicious, being formed by the Officers of both the Univerſity and Town; the Vice-Chancellor being always a magiſtrate by virtue of his office; and no place can boaſt of more ſtrict and impartial juſtice in its government, than the Town of Cambridge.

The town is divided into four wards; *viz.* 1. Bridge-ward, which extends from Jeſus-lane, to Caſtle-End; 2. High-ward, which extends the length of Trumpington-ſtreet; 3. Preacher's-ward, which extends from the entrance of the town, by St. Andrew's Street, to Jeſus-lane; 4. Market-ward, which contains the Market-place, and the adjoining ſtreets, lanes, and rows.

Each of the fourteen pariſhes, with one exception, is provided with a church; but thoſe only of Great St. Mary, and St. Sepulchre, preſent objects of ſufficient importance for particular obſervation.

ST. MARY's CHURCH*

Is ſituated in the middle of the town, oppoſite the Univerſity Library, &c. To this church the Univerſity repair on Sundays and Holidays, to hear Sermons; though the pariſhioners have ſeats, and the uſe of the church at different times in the day. It was erected by voluntary contribution; but whether the charges exceeded the eſtimate, or from whatever cauſe, the ſubſcriptions were raiſed ſo ſlowly, that the ſtructure was not completed till the expiration of more than one hundred years. It was commenced in 1478; but was not finiſhed with the tower till 1608. It conſiſts of a nave, chancel, and ſide aiſles; the whole length is about 120 feet; the breadth, 68. Between the nave and the chancel, is a grand and noble gallery, called the *Throne*, in which are the ſeats of the Vice-Chancellor, Heads of colleges, Noblemen, and Doctors; in the lower part of the church is the *Pit*, containing ſeats for the Proctors, Maſters of Arts, Fellow-Commoners, &c. and over the ſide aiſles, are extenſive galleries for the Bachelors and Undergraduates. At the weſt end is a ſpacious Organ-loft, containing a large and fine-toned Organ. On the performance of Oratorios, or the taking of Muſical degrees, at the Commencement, the Organ loft is much enlarged, for the accommodation of the vocal and inſtrumental performers, engaged for the occaſion. This church, which is in the Gothic ſtyle, is adorned with a handſome and lofty tower, crowned with four elegant pinnacles, and containing twelve remarkably muſical bells, which are ſet in motion on all public occaſions. A few years ſince about £1500. was expended in repairing this ſtructure; the Univerſity paying two thirds, and the pariſh one third of the expence. Trinity College always repairs the chancel.

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* The mile-stones in the neighbourhood of Cambridge (ſaid to be the firſt of the kind in England) were ſet up at the expence of Dr. Monſey, of Trinity Hall. In Bloomfield's Collectanea Cantab. p. 214, the meaſurement is affirmed to begin at a circle, cut in the right hand jamb of the weſt door of this church. This circle is now effaced.

ST. SEPULCHRE's CHURCH,

Uſually called, from its form, *the Round Church,* on account of its ſingular ſhape, excites the curioſity of the antiquary; though its primary form has been much disfigured by ſubſequent buildings, and in its preſent ſtate appears under many diſadvantages. "It is evidently," ſays Mr. Eſſex, "a ſtory higher than its original architect intended it ſhould be. This alteration was made in the reign of Edward II. for the reception of bells, when the windows were alſo altered, the chancel added, and the ornaments about the door defaced, and partly hidden by a wooden portal." The more antient part is completely circular, with a periſtyle in the interior, of eight round pillars of great magnitude, and far greater ſolidity than could be neceſſary to ſupport the conical roof, with which it appears to have been originally furniſhed. The arch over the weſt door is embelliſhed with round and zigzag mouldings, in the Saxon ſtyle of architecture. This entrance was probably the only one when the church was firſt built, but the circular area is now thrown open to the chancel. The pillars of the upper portico were formerly hidden by a projecting gallery, but this has been lately removed, and the inſide of the fabric, repaired and white-waſhed.

The proper name of this building is, "the Church of the Holy Sepulchre in the Jewry," an appellation which generated the erroneous opinion, that it was originally a Jewiſh ſynagogue; but the ingenious architect juſt quoted, affirms, that it was built by the Knights Templars,* or by ſome perſons concerned in the Croiſades, who took the church of the Holy Sepulchre at Jeruſalem, for their model. "It will be eaſier," obſerves our author, "to aſcertain the age, than the founder of it;" and he afterwards expreſſes his decided opinion, that it was erected in the reign of Henry I. or between the firſt and ſecond Croiſades, and is the oldeſt church of the form in England.†

THE MARKET-PLACE, &c.

Which is ſituated nearly in the centre of the town, conſiſts of two ſpacious oblong ſquares, united together, and forming the Roman L. At the bottom ſtands the SHIRE HALL, which was built at the expence of the County; it is a handſome ſtructure of brick and ſtone; the upper part is ſupported on arches faced with ſtone, beneath which the butchers have their ſtalls on the principal market-days. This building is ornamented with a parapet, and a pediment in the centre; and is upwards of 80 feet in length. The interior is divided into two courts, in one of which the aſſizes are held, and in the other the quarter ſeſſions.

Behind this fabric is the TOWN-HALL, rebuilt for the uſe of the Corporation, in the year 1782. It is a modern and elegant building of brick, conſiſting of a ſpacious Court-room, 70 feet long, 28 broad, and 23 high; beſides two large parlours, for the Aldermen and Common Council-men. In the large room, the greateſt part of the concerts and balls are generally held; as well as the public dinners of the Corporation.

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* The Knights Templars were instituted, in the year 1118, to protect the pilgrims who viſited the ſacred places about Jeruſalem. Apartments were allotted them, near the church of the Holy Sepulchre.

† The only two ſimilar churches in England are, Little Maplested, in Eſſex, and the Temple church at London.

In the front of the Shire-Hall ſtands the CONDUIT; erected in the year 1614, at the charge of Thomas Hobſon, the celebrated carrier, on whoſe death Milton wrote a whimſical epitaph; it is built with ſtone, decorated with rude carvings, and encloſed with an iron paliſade. The water is brought by a ſmall channel from a brook about three miles from the town, and is conveyed beneath the principal ſtreet, by an aqueduct, to the conduit; which continues always running through four ſpouts, ſupplying the neighbourhood with a never failing ſtream of excellent water. An inſcription on the north ſide records its erection, in the year 1614; and alſo that Hobſon, on his death, which happened January 1ſt, 1630, bequeathed the rents of ſome paſture land, lying in *St. Thomas' Leys*, to preſerve it in order. The rents of two tenements were alſo given for that purpoſe, by Edward Potts, an Alderman of Cambridge. It may be worthy of remark, that one of the moſt general proverbial expreſſions in the Engliſh language originated with the above benevolent carrier; who rendered himſelf famous by furniſhing the ſtudents with horſes, and making it an unalterable rule, that every horſe ſhould have an equal portion of reſt, as well as labour, he would never let one out of its turn; and hence the derivation of the ſaying, "Hobſon's Choice: *this*, or none."

The market is abundantly ſupplied with every kind of proviſion; but, from the unvarying conſumption of the Univerſity, the articles are comparatively dear. The principal market-day is Saturday; when the immenſe quantity of every neceſſary article expoſed for ſale, is aſtoniſhing; here is alſo a market every day in the week, except Sunday and Monday, for poultry, eggs, and butter. The ſale of the laſt article is attended with the peculiarity of every pound, deſigned for the market, being rolled out to the length of a yard; each pound being in that ſtate, about the ſize of a walking cane; this practice, which is peculiar to Cambridge, is particularly convenient, as it renders the butter extremely eaſy to divide into the ſmall portions, called *ſizes*, for the uſe of the colleges.

ADDENBROOKE's HOSPITAL.

Which is the general infirmary for the town and county, is a handſome modern building of brick, ſituated near the ſouth entrance of the town; it was ſo named from John Addenbrooke, an eminent Phyſician, who in the year 1719, bequeathed about £4000. on the death of his widow, to erect and furniſh an Hoſpital for the gratuitous care of the indigent diſeaſed. Mrs. Addenbrooke died in March, 1720; but the inſolvency of one of her executors, who had poſſeſſion of the money, cauſed a conſiderable delay in the inſtitution. The truſtees, at length, having obtained a decree of Chancery in their favor, the building was finiſhed; but the remaining funds being inſufficient to complete the charity, an aſſociation was propoſed to carry it on by ſubſcription; and an act was procured, in July 1766, to alter the original deſign of Dr. Addenbrooke, and make it a *general* Hoſpital. It has ſince been generouſly and handſomely ſupported by liberal donations, yearly contributions, the produce of Oratorios, &c. The number of perſons admitted and relieved ſince that period, is averaged at 700 annually. The governors of this inſtitution conſiſt of the principal Officers of the Univerſity, town, and county of Cambridge.

Here are ſeveral other charitable inſtitutions in this town; of which, the principal is, the Free Grammar School, founded in purſuance of the will of Stephen Perſe, fellow of Bene't college. With the property bequeathed by this gentleman, who died on the 30th of September, 1615, a ſchool houſe was built on a ſpot called *Lithburn*. but now Free ſchool lane, ſufficiently ſpacious for *One Hundred Boys*, who were to be natives either of Cambridge, Cheſterton, Trumpington, or Barnwell; and to be educated by a maſter and uſher; whoſe ſervices were to be requited by the reſpective ſalaries of 40l. and 20l. yearly. By ſome miſmanagement the original intention of this excellent inſtitution is perverted; as two or three ſcholars is generally the largeſt number at preſent educated, and theſe receive their leſſons at the lodgings of the maſter. This abuſe is the more to be regretted, as the children, generally ſpeaking of the poor inhabitants of Cambridge, are rude and uninformed. Beſides this, there are a number of charity ſchools in Cambridge; which are ſupported by endowments, benefactions, and voluntary ſubſcriptions; where a vaſt number of boys and girls are taught reading, writing, and the common rudiments of arithmetic. The aged and infirm are alſo comfortably provided for, in many different alms-houſes in this town; ſome belonging to colleges, and others, endowed by generous and humane individuals.

THE CASTLE, &c.

Of the *Caſtle* of Cambridge, built by William the Conqueror, the gate-houſe only now remains; which is employed as a jail for the county: it is ſituated at the north weſt entrance of the town. This fabric being in a ruinous ſtate, and too ſmall for its purpoſe, it was propoſed to erect a new priſon at the expence of the county; the building was undertaken by Mr. Brown the architect, and is now in a ſtate of great forwardneſs: it is from a convenient and extenſive plan of the celebrated philanthropist, Mr. Howard. The buildings are encloſed in an octagon court, ſurrounded by a lofty wall; the front next the ſtreet is handſomely built with stone. Near the Caſtle is a high artificial hill, from the ſummit of which is a fine and extenſive proſpect; the town, and greater part of the univerſity, is diſtinctly ſeen, and the ſurrounding villages are plainly diſcovered in the view; it is terminated by Ely Cathedral, which may clearly be distinguiſhed with the naked eye.

Near the ſouth east entrance of the town, is ſituated the Town Jail; it is a commodious new building of brick, with the Bridewell contiguous to it, ſurrounded by a lofty wall.

Here are two diſſenting meeting-houſes at Cambridge: the *Anabaptiſts'* is ſituated in St. Andrew's-street, and is a plain building, well adapted to its purpoſe. The *Independents' Meeting-houſe*, is near the town jail; it is a handſome new building of brick and stone, neatly and conveniently fitted up.

AMUSEMENTS, SOCIETY, &c.

Cambridge can boast fewer public amuſements, than perhaps any town of its ſize and conſequence in the kingdom: the most general and rational amuſement of the age, plays are excluded from the town; indeed the reaſons why stage performances are prohibited in a Univerſity are manifest, nor would it be conſistent with the prudence and ſenſe of its governors to permit them. To recompence the town, in ſome meaſure, for the deprivation of this favourite ſpecies of amuſement, dramatic exhibitions are allowed, during the continuance of Stirbitch Fair; where a ſpacious ſtructure is fitted up for the occaſion, and the Norwich company of performers, for the ſpace of three weeks, amuſe the public with their exertions. Theſe are by no means of the lowest order, the principal performers are perfect masters of their art, and there are few provincial companies ſuperior to them in the kingdom.

The principal, and almost only public amuſements of Cambridge, are concerts; theſe are numerous, and many of them in the first style of excellence, particularly thoſe at the Commencement; when the very first vocal and instrumental performers in England are engaged. Theſe concerts are generally performed at the Town Hall; except at a public Commencement, when the Senate Houſe is lent for the occaſion, and oratorios are performed in St. Mary's church. Some idea may be formed of the excellence of the performances, when we ſay that they have been honoured with the reſpective vocal powers of Mara, Mr. and Mrs. Harriſon, Bartleman, Incledon, Sig. Storace, Braham, Madame Duſſek, Mrs. Mountain, Mrs. Bland, &c. and the inſtrumental ſcience of Lindley, Pinto, Greatorex, Cramers, Sauſte, Greiſbach, Holmes, Aſhley's, &c. All the Concerts are under the direction of Dr. Charles Hague, the preſent Profeſſor of Muſic; who always leads the band, and whoſe excellence on the Violin is of the firſt order.

Beſides theſe, there are very reſpectable ſubſcription concerts, ſupported by the inhabitants of the town, during the winter. Theſe are performed at the Black Bear Inn.

Public Balls are almoſt as totally excluded from the town as Plays, though not from the ſame prohibition. Many reaſons might be aſſigned why aſſemblies do not prevail in Cambridge; but it would be neither conſiſtent with the intentions of our work, nor ſerve to intereſt ſtrangers, to diſcuſs the ſubject. The principal ball is the one at Commencement; which is attended by a numerous aſſemblage of genteel people.

Though Cambridge affords ſo few public amuſements, its inhabitants are by no means averſe to them; and to compenſate for the defection, form numerous private aſſemblies and entertainments among themſelves; for in no place are the generality of people more inclined to elegant ſociety, than in this town. Amongſt other ſocieties are ſeveral *Book Clubs*, formed on different plans: the principal of them is held at the Bull Inn, and poſſeſſes an excellent library, There are alſo three *Freemaſon's Lodges* in this town, each of which has a large number of members.

Very little buſineſs of any kind is carried on at Cambridge, but what is either immediately or remotely connected with the Univerſity; but owing to its importance, as the county town, and its convenient ſituation, as the head of inland navigation from Lynn, it has an extenſive trade in coals and corn. Great quantities of butter are conveyed every week from Norfolk, and the Iſle of Ely, by water to Cambridge; and, from thence ſent up to London, where its fame as Cambridge butter, is well known.

Owing to the members of the Univerſity, Cambridge is poſſeſſed of a number of the most excellent masters, in all the polite arts and ſciences. The principal reſident French teacher is M. Gouſſel, who is recommended to the Univerſity by Dr. Symonds, Profeſſor of Modern History and Languages; this gentleman teaches the language from the rudiments of his own grammar; and during a reſidence of ſixteen years, has evinced the greatest proof of his excellence; that of the public approbation. Here are alſo ſeveral natives of France, who teach during term, but mostly are abſent in the vacation. The town is provided with muſic-maſters of great ſcientific ſkill; the following are the principal: Dr. Hague, as a teacher of the Violin and Piano-forte; Dr. Clarke, and Mr. Pratt, of the Piano-forte; Mr. Scarborough, of the Violin, and the Meſſrs. Nicholls's, of the Flute. Here are likewiſe two very good drawing-masters: Mr Baldrey, oppoſite the Senate houſe, the artist who executed the painting of the East Window of King's College Chapel; this painting is now exhibiting at the artist's houſe. The engraving from it is in great forwardneſs; and, with ſufficient encouragement, it is Mr. Baldrey's intention to publiſh a ſeries of prints from theſe celebrated windows. Mr. Harraden is alſo a teacher in drawing; and, from his merit as an artist, as well as a master, has received the greatest encouragement in the University and town. The following is a liſt of the prints, from drawings executed by Mr. Harraden, now ſelling at his houſe, ſouth ſide of St. Mary's church.

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The Univerſity and Town of Cambridge, illuſtrated by thirty two Views.

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5. King's New Building, West End of the Chapel, and Clare-Hall from the walks of King's College.
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8. Trinity Hall.
9. The Great Gate of Trinity College.
10. Part of the Great Court of Trinity College, including the Conduit and Hall.
11. Part of do. including the Chapel and Lodge.
12. Weſt End of Neville's Court, Trinity College.
13. Eaſt End of do.
14. The Gate and part of St. John's College.
15. The Bridge and part of do.
16. Magdalen College.
17. Sidney College.
18. Chriſt's College.
19. Emmanuel College.
20. The Lecture Room in the Botanic Garden.
21. The Green Houſe, &c. do.
22. Bene't College.
23. The Shire and Town Hall, with Hobſon's Conduit, and part of the Market Hill.
24. Ely Cathedral.

The size of theſe Views is, 10 inches by 8. Price 2l. 2s. the Set, or 2s. for a single View.

A fine print from the STATUE of SIR ISAAC NEWTON (by Roubiliac) in the Chapel of Trinity College; from a drawing taken on the ſpot; ſize of the Print, 26 by 18 inches; price 1l. 1s.

THE COSTUME OF THE UNIVERSITY OF CAMBRIDGE.

This beautiful work is now publiſhing in Numbers, to be completed in four numbers, each containing four finely coloured engravings of the coſtume of the various orders in this Univerſity, price 10s. 6d. each number. The two first have appeared, and have received great encouragement and patronage.

Mr. Harraden's Views of Oxford are in great forwardneſs, and may be had at his houſe, South side of St. Mary's church, Cambridge.

CIRCULATING LIBRARY.

The principal *Circulating Library* in Cambridge, is Nicholſon's in Trumpington street. This Literary Repoſitory has been eſtabliſhed above fifty years, and may now be conſidered as one of the first in the kingdom: it is upon a different plan from any other extant; consisting principally of claſſical and mathematical books, adapted to the lectures and studies of the University. The immenſe number of volumes, contained in this Library, is aſtoniſhing; for it poſſeſſes three, four, and even five hundred copies of many publications, ſome of which are extremely ſcarce and of great value. The University and town are alſo accommodated here, with books of amuſement and univerſal inſtruction; viz. Divinity, Law, Physic, History, Biography, Voyages, Travels, Novels, Romances, Poetry, Plays, &c. &c, &c. in all languages: affording a Library adapted either for the ſtudy of the learned, or the inſtruction and amuſement of the public in general. The terms of this Library are: ſubſcriptions 7s. 6d. per quarter; for which ſum each ſubſcriber is allowed FIFTEEN BOOKS at once, to be changed as often as agreeable. Books are alſo let out, on very moderate terms, by the volume or ſet, for any length of time. This *Circulating Library* has received the greateſt encouragement from the members of the Univerſity, who in general become ſubſcribers on their arrival at college. The number of ſubſcribers in the Univerſity, (independent of the town and county) during term, generally exceeds *five hundred*.

The principal Bookſellers in the town are: Nicholſon, at the Circulating Library, and Deighton, in Trumpington-ſtreet; Barrett, in All Saints Church-yard, Flower, in Bridge street; and Gee, in the Market-place. A Circulating Library, principally for Novels, &c. is kept by Page, in Shoemaker Row. A weekly newſpaper is publiſhed by Hodſon, called the " Cambridge Chronicle;" which experiences a ſale perhaps exceeded by few provincial papers in the kingdom.

As few things contribute more to the comfort and pleaſure of travelling, than good accommodations, it may not be thought uninteresting or inconſiſtent, to enumerate thoſe Inns where the beſt accommodations are to be had. The following are the principal.

The Black Bull, }
The Sun, } Trumpington-ſtreet.
The Roſe, Market-hill.
The Red Lion, Petty-cury.
The Hoops, Bridge-street.
The Eagle and Child, Bene't-ſtreet.

Beſides these, are two excellent Coffee-houſes, namely, the Roſe, in the Market place; and the Union Coffee Houſe, Bridge-ſtreet.

MIDSUMMER, OR POT FAIR,

Is held annually on a common near Jeſus College, called Midſummer green; it commences on Midſummer-day, and continues a fortnight. This fair is ſaid to have originated with the large aſſemblages of children, and others, which attracted the notice of the Pedlars, who began to diſpoſe of their merchandiſe on this ſpot as early as the reign of Henry I. The principal article now brought here for ſale is Earthen-ware, whence it obtained the appellation of *Pot Fair*. Rows of booths are alſo erected for the ſale of China, Drapery, Toys, &c. and, on the principal day, is a large Fair for horſes. It is proclaimed, on Midſummer-eve, by the chief officers of the Univerſity, and the Mayor and Corporation ſucceſſively. The charter was granted by Henry III. Midſummer Fair is a favourite promenade of the inhabitants of Cambridge; its celebration happens at the time of the commencement, and, on moſt evenings, the green is crowded with a large aſſemblage of genteel and well-dreſſed company.

There was formerly another feſtival, called *Garlick Fair*, celebrated here; which was granted by Henry VI. to the Nuns of St. Rhadegund, and held in Jeſus-lane, on the 14th of Auguſt, and two following days; but this is now nearly aboliſhed.

STURBRIDGE FAIR.

This celebrated Fair, uſually called *Stirbitch Fair*, is held in a field about a mile diſtant from Cambridge, a little to the eaſt of Barnwell: its charter has been repeatedly confirmed by different Sovereigns. The field where the Fair is annually held, is above half a mile ſquare, bounded by the river Cam on the north, and the Sture on the eaſt. The ground is marked out, on the 4th of September, by the Mayor and Aldermen, when the dealers are allowed to erect their booths; and, on the 18th of September, the Fair is proclaimed, with much ſolemnity, by the Vice-Chancellor, and Heads of the Univerſity; and the Mayor and Corporation of the town. The time of its continuance is fourteen days.

This fair was formerly by far the largeſt in England; but, through the great alterations in the modes of conducting commerce, and the introduction of turnpike-roads and canals, its buſineſs has been gradually declining for many years; though it is ſtill very conſiderable. In the year 1605, the fair was firſt attended by Hackney coaches from London; and the multitudes of people aſſembled in ſome years, have been ſo great, that upwards of ſixty coaches have plyed at one time; though at preſent, their number ſeldom exceeds eight or ten. But diminiſhed as is the trade of this once celebrated mart, it still retains a large buſineſs in wool, hops, leather, cheeſe, and iron; and two days (September the 25th and 26th) are appropriated to the ſale of horſes. The booths are erected in regular streets, containing ſhops of numerous trades; and in favourable weather, a large concourſe of people attend for ſeveral miles round. At the entrance of the fair, by the road ſide, stands the THEATRE; a ſpacious and lofty edifice of wood, fitted up very conveniently; where during the three weeks allowed for the fair, performances are exhibited every evening, by the Norwich Company of Comedians. A most melancholy accident occurred here on the 27th of September, 1802. During the performance, when the Theatre was uncommonly crowded, ſome ill-deſigned perſons gave an alarm of fire; in conſequence of which, the whole houſe was thrown into the utmost confuſion; and, through the too haſty, but natural efforts of the audience to eſcape, a ſcene of the moſt diſtreſſing and ſhocking deſcription enſued. Five perſons were trodden to death, and a great number ſeverely hurt and bruiſed: but neither the exertions of the magiſtrates, nor the liberal offers of the manager, could lead to a diſcovery of the villanous alarmists.

A court for the prompt administration of justice, is always held during the fair; in which the mayor, or his deputy preſides as judge, to determine controverſies and to preſerve decorum. He is attended by eight ſervants, called *Red-coats*, who are employed in the duty of constables.

Remarkable and grand Common Days held by the Corporation of Cambridge.

January.	Grand common day, the day after Plough Monday.
Jan. 18.	Queen's birth day celebrated.
April.	Grand common day, Hock Tueſday, or Tueſday fortnight after Eaſter.
June 4.	King's birth day celebrated.
22.	Midſummer fair proclaimed.
Aug. 16.	Election of mayor, bailiffs, coroners, &c.
24.	Grand common day.
Sept. 4.	Stourbridge Fair laid out,
18.	——————proclaimed.
25.	Horſe fair day at Stourbridge.
29.	Grand common day, the mayor and officers ſworn.
Oct. 25.	The King's acceſſion to the throne, celebrated.
Nov. 4.	The glorious revolution of 1688, celebrated.

CAMBRIDGESHIRE.

WHICH during the Heptarchy compoſed part of the kingdom of Eaſt Anglia; is bounded on the north weſt by the counties of Northampton, Huntingdon, and Bedford; on the ſouth by Hertfordſhire and Eſſex; on the eaſt by Suffolk; on the north eaſt by Norfolk; and on the north by Lincolnſhire. Its greateſt length is about 50 miles; its greateſt breadth, at the ſouthern and wideſt extremity, is ſomewhat more than 25; its circumference is about 130. It contains nearly 443,300 acres, 17 hundreds, 163 pariſhes, 7 market towns, about 16,450 houſes, and 89,400 inhabitants. The limits on the northern half are chiefly rivers, and their communicating branches; on the ſouthern the boundaries are wholly artificial. It ſends 6 members to Parliament; *viz.* 2 for the county, 2 for the Univerſity, and 2 for the town of Cambridge; pays 9 parts of the Land-tax, and provides 480 men for the national militia.

The principal rivers of Cambridgeſhire are the *Ouſe* and the *Granta*, or *Cam*. The Ouſe enters the county between Fenny Drayton and Erith; thence it runs eaſtward through the fens, till, at ſome diſtance above Denny Abbey, it aſſumes a northerly direction, and paſſing Stretham, Ely, and Littleport, flows into Norfolk. The Cam has three branches, the chief of which riſes near Aſhwell, in Hertfordſhire; and enters this county to the weſt of Gilden-Morden, thence flowing to the north-eaſt, it receives ſeveral rivulets; and near Grantcheſter has its current enlarged by the united waters of its ſiſter ſtreams, which flow into this county from Eſſex. Hence taking a northerly courſe, the Cam glides through the walks of the principal colleges at Cambridge, and, having paſſed ſeveral villages, falls into the Ouſe at Harrimere, in the pariſh of Stretham.

Beſides the above rivers, whoſe channels appear to have been marked out by nature, there are numerous ſtreams in north part of Cambridgeſhire, which were dictated by the conveniences, and formed by the induſtry of man. Theſe interſect the county in various directions; and by carrying off the ſurplus waters of the fens, have been the means of bringing many thouſand acres into cultivation. The chief drains are the old and new Bedford rivers, which are navigable for upwards of twenty miles, in a ſtraight line acroſs the county from Erith to Denver.

The county of Cambridge, though flat, bleak, and open, is much diverſified. The elevated ſpots on which the towns and villages are built in the northern diviſion of the county, appear like iſlands riſing from the midſt of low and level marſhes; and the churches being generally erected on the higheſt parts, may be diſtinguiſhed at the diſtance of ſeveral miles. The cottages are, in many places, nothing more than mud walls covered with thatch or reed. The ſouth-eaſtern diviſion, reaching from Gogmagog-Hills to Newmarket, is bleak, heathy, and thinly inhabited; being connected with that vaſt track of land, which, extending ſouthwards into Eſſex, and northwards acroſs Suffolk into Norfolk, forms one of the largeſt plains in the kingdom. The ſouth and ſouth-weſt parts of the county, which principally conſiſt of elevated land, exhibit a remarkable and pleaſing contraſt to the northern diviſion.

The ſoil of Cambridgeſhire is varied; conſiſting about Wiſbeach of a mixture of ſand and clay; in the fens, of a ſtrong black-earth, lying on a gault or gravel; in the uplands, of chalk, gravel, loam, and tender clay. The greateſt part of the land is open field; but incloſures are rapidly taking place, new bills for that purpoſe being obtained every ſeſſion of Parliament. The application of the land is extremely various. In thoſe parts which have been preſerved from the floods, or are ſubject but to occaſional overflows, it has all the fertility of water-meadows. The crops of oats are particularly exuberant; great quantities of wheat and cole-ſeed are alſo grown; while many thouſand acres, particularly on the north-weſt ſide, are appropriated to paſture. Some very fine butter is produced in this county; and the vicinity of Cottenham is famous for a kind of new cheeſe, of a ſingularly delicious flavour. The ſouth and ſouth-weſtern parts are productive of fine wheat, barley, and oats; though the heaths and commons that interſect theſe diſtricts furniſh ſuſtenance for many thouſand ſheep, chiefly of the Norfolk and Weſt Country kinds. In ſome of the pariſhes bordering on Eſſex, ſaffron is cultivated.

Cambridgeſhire, with the exception of a few pariſhes on the eaſt and north-eaſt ſide, which belong to the Sees of Norwich and Rocheſter, was taken from the See of Lincoln, by Henry I. in 1114, and made into a ſeparate dioceſe for the newly erected Biſhopric of Ely. It is included in the Norfolk circuit of the judges.

BARNWELL, a village ſituated about half a mile north-eaſt of Cambridge, formerly contained a Priory called *Barnwell Abbey*, the ſite of which is now occupied by a farm-houſe. The ancient walls ſtill ſurround a portion of the grounds, and ſeveral buildings formerly belonging to the Priory are now uſed as barns. The village contains about 300 inhabitants. A little to the eaſt of Barnwell the celebrated STIRBITCH FAIR is annually held, as we have obſerved in our deſcription of the town of Cambridge.

CHESTERTON, is a large village, a mile north of Cambridge, principally inhabited by Farmers. The *Church* is an ancient and ſpacious building, with a nave, chancel, and ſide aiſles. The remains of a manſion in this place formerly belonging to the Priors of Barnwell, is now uſed as a granary. The pariſh contains 650 inhabitants.

IMPINGTON is a ſmall village, rendered memorable by the ſingular caſe of one of its female inhabitants, who loſt her way during the inclement winter of 1799, and was overwhelmed in a ſnow-drift, where ſhe continued nearly eight days and nights, but was diſcovered alive, and ſurvived her confinement ſeveral months. This unfortunate woman, whoſe name was Elizabeth Woodcock, was returning from Cambridge market on horſeback, February 2, 1799, and was within half a mile of her own houſe, when her horſe ſtarted at a ſudden light, and, fearing ſhe ſhould be precipitated into a neighbouring ditch, ſhe diſmounted. The horſe ſoon afterwards broke from her, and ſhe purſued him over tbe fields. Having recovered the bridle, ſhe retraced her ſteps towards home; but, wearied and benumbed, ſhe releaſed the horſe, and ſat down under a thicket, round which the ſnow rapidly accumulated, and by eight o'Clock, quite encloſed her; ſtill continuing to fall 'till it increaſed to near four feet in thickneſs, over her head. In this miſerable ſituation, benumbed and exhauſted, ſhe remained till the tenth day of the month, when the thaw rendered viſible a handkerchief ſhe had contrived to raiſe on the upper branches; and ſhe was diſcovered by a farmer, who, having procured aſſiſtance, quickly releaſed her. During the whole period of her ſecluſion, ſhe had ſlept very little, and being totally without nouriſhment, except what ſhe obtained by ſucking the ſurrounding ſnow. Every aſſiſtance was afforded her by the ſurgeons in Cambridge, but the mutilated ſtate of her frame (her toes being mortified ſo as to drop off) preyed on her mind, and finally deprived her of life.

MILTON was the retirement of the late Rev. William Cole, an eminent antiquary. In this village is a neat modern reſidence, belonging to Samuel Knight, Eſq.

DENNY ABBEY, nearly midway between Cambridge and Ely, was originally a cell of Benedictine Monks; till their poſſeſſions became the property of the Knights Templars. This order being diſſolved in 1312, their eſtates were granted by Pope Clement V. to the Knights Hoſpitallers, who regranted Denny Abbey, to Edward II. Edward III. beſtowed it on Mary, Counteſs of Pembroke, who founded here a nunnery; and was on her death (which happened in 1374,) interred here. The eſtate of Denny has for many years been occupied by the Hemmington family. The ſite of the Abbey is occupied by a ſpacious dwelling-houſe. The tranſept of the chapel still remains, and, with the refectory, is uſed as a barn. The walls incloſe an area of about four acres, and were formerly ſurrounded by a moat, nearly the whole of which may yet be traced.

COTTENHAM was the birth-place of *Thomas Tenyſon*, Archbiſhop of Canterbury. It is a ſmall unfrequented village.

LONG STANTON is a ſmall village, ſeven miles from Cambridge, where the Hatton family have been ſeated ever ſince the end of the ſixteenth century. The ancient manor houſe was a venerable building erected about the year 1560; but has partly been taken down, and a ſmaller manſion built, which is inhabited at preſent by Dingley Hatton, Eſq. brother to Sir John Hatton. This village has two churches; though the inhabitants do not exceed 250.

MADINGLEY is the ſeat of Admiral Sir Charles Hinde Cotton, Bart. The manor houſe is an ancient brick building, nearly ſurrounded with woods and pleaſure grounds, and from the road has a very picturesque appearance. Near the grand entrance is an ancient but beautiful Gothic gate-way, ornamented with a variety of elegant carving. The interior of the manſion is elegantly fitted up, and contains a vaſt number of paintings: amongſt which are thoſe of *Sir John Hinde Cotton*, Bart. by Sir Godfrey Kneller; *James Craggs, Eſq.* and *William Stukeley, Eſq.* by Walter. The village church is a ſmall, but very neat ſtructure, with a beautiful painted window over the Communion-table, repreſenting the *Crucifixion.* Some monuments of the Cotton family are in the church. The pariſh contains about 150 inhabitants.

CHILDERSLEY, a reduced village, near Madingley, was formerly the ſeat of the Cutts family.

CAXTON is ſituated on a Roman road, on the weſtern ſide of the county; and though both a market and poſt town, it hardly contains more than 40 houſes, of a mean appearance.

GAMLINGAY is a village of conſiderable extent, containing about 700 inhabitants. At HATLEY ST. GEORGE is the reſidence of Thomas Quintin, Eſq. conſiſting of a ſmall Park, well laid out, and an exceedingly pleaſant manſion.

WIMPOLE, the ſeat of Philip Yorke, Earl of Hardwicke, and Lord Lieutenant of Ireland, is by far the moſt ſplendid private reſidence in the county. The manſion-houſe is a ſpacious brick ſtructure, with extenſive wings; which have been erected ſince the centre part of the building. The eaſt wing is connected with the offices, and the weſt with a large Greenhouſe. The entrance to the Hall is by a double flight of ſteps. The interior of this fabric combines neatneſs with elegance, and has been lately improved by the preſent Earl, and ſeveral of the chambers thrown into one, which is ſplendidly fitted up as a ſtate drawing-room. The various apartments contain a magnificent aſſemblage of paintings; many of them are by the firſt maſters; the following is a liſt of thoſe which appear moſt valuable. In the *Gallery* are the following:

BEN JONSON, Cornelius Janſon; the countenance of the poet is thoughtful and penetrating. He is delineated ſeated at a table, with a pen in his hand, apparently in the act of ſtudy. The whole expreſſion is dignified and noble.

FRANK HALS, by himſelf. This is a very curious head. The painter has portrayed himſelf with rough hair and huge whiskers. An air of eccentricity and wildneſs pervades the countenance.

A VENETIAN NOBLEMAN; Titian. Extremely fine.

IGNATIUS LOYOLA; Titian. The features of this extraordinary man, who was the founder of the ſociety of the Jeſuits, are expreſsive of much thought.

SPINOLA, the famous Spaniſh General. Ruben.

HEAD OF A MONK, by ſome ſuppoſed to be Martin Luther.

A half length of a lady, delineated looking over a balcony. This was brought from Italy by Lord Hardwicke. The coloring is extremely rich and brilliant.

The Library is a noble apartment, and the collection of books extremely ſelect and valuable. It contains the beſt editions of both Engliſh and foreign authors, in every branch of literature; beſides many volumes of curious engravings. The room is plain, but neatly fitted up, and ornamented with the portraits of the moſt eminent writers: among theſe are heads of Lord Somers, Warburton, Dr. Clarke, Ben Johnſon, Pope, Sir Iſaac Newton, and Dr. Barrow; a whole length of *Biſhop Burnet*, by Sir Godfrey Kneller; and a half length of *Mathew Prior*; a very ſpirited reſemblance. In this apartment is a very fine carving, in ivory, of our Saviour on the Croſs; brought from Italy by Lord Hardwicke. The agony of the countenance and the appearance of the body drawn up by extreme pain, are exceedingly well repreſented. Beſides the books contained in this library, Lord Hardwicke has a large and valuable collection of ſtate papers, and manuſcripts, preſerved in an apartment ſecured from fire.

The following are the moſt celebrated of the pictures in the different apartments.

David and Goliath; Giorgione; animated and well coloured.

The Angel appearing to Hagar. The figure of Hagar on her knees is extremely fine.

The inside of the church of St. John de Lateran, at Rome.

Virgin and child; Old Palma.

VANDYCK, a head, by himſelf.

The laughing and crying Philoſophers; Rubens.

Virgin and child, ſurrounded with flowers; Vandyck

The passage of the Israelites.

A Battle Piece; Rosa di Tivoli.

SIR THOMAS MOORE; Holbein.

JOB AND HIS WIFE; a very singular painting. The body of Job is naked, and covered with boils. Near him stands his wife, who from her figure and expression, appears to be telling him to "curſe God and die."

A curious piece, called a Philosopher's ſtudy; Old Franks.

Roman charity; Rubens.

RICHARD, Earl of Warwick; Vandyck.

JOHN DE WITT, Grand Pensionary of Holland.

Moon light scene; sea view; Marlow. This is a most exquisite and well managed performance.

The burning of the Turkish fleet in the Bay of Conſtantinople; a companion to the above.

The love sick Maid; Opie. A very fine picture.

Virgin and child; Titian.

Landscape; Salvator Rosa.

LORD ROYSTON, when a child; Sir Joshua Reynolds.

Hermit in his cell; Rembrandt. Very fine.

Head of St. Peter, with the keys and a book; Guido.

Inſide of a Green Grocer's cottage; Teniers.

Marriage of the Virgin; Luca Giordano.

EDWARD VI. ancient; on board.

Venus and Mars; Luca Giordano.

The temptation of St. Anthony; Rubens, and other artists.

RAPHAEL; a very fine portrait ſaid to be by Titian.

LORD SOMERS, with the Seals.

THE HOUSE OF COMMONS in the time of the Speaker Onslow. This was painted by Sir James Thornhill, assisted, as it is suppoſed, by Hogarth, his ſon in law. The characters most conspicuous, are those of the Speaker; Sir Sydney Godolphin; Colonel Onſlow; and Sir Robert Walpole. who is in the attitude of rising Sir James Thornhill, being then a member, has also introduced his own portrait.

LORD ANSON, a head.

PHILIP YORKE, the Chancellor, and firſt Earl Hardwicke; W. Hoare. 1763.

PHILIP YORKE, the ſecond Lord Hardwicke; Sir Joshua Reynolds.

MISS CATHERINE FREEMAN, firſt wife of the Hon. C. Yorke, and mother of the present Lord Hardwicke.

The Lake of Albano; More. Very finely colored.

In the Drawing Room is a very fine piece of moſaic work, representing the temple of the Sybils. The principal figures introduced are a man and two cows; the latter are admirable; and the whole performance very beautiful; at a little distance it cannot be diſtinguiſhed from painting.

GEORGE I, GEORGE II, GEORGE III, QUEEN CHARLOTTE; Marshall Laudohn; Mr. Pelham; Thomas Holles, Duke of Newcaſtle; Lord Lyttleton; Lord Chesterfield; the great Hampden; Mrs. Montague; and numerous other portraits, are preserved in this mansion.

The private Chapel, is an apartment in the houſe, ornamented with various figures of Roman Saints and Pontiffs on the walls, and a large painting of the *Nativity*, over the altar; all by Sir James Thornhill.

The grounds in the vicinity of the manſion are rather flat; but from ſome parts of the Park, the views are extenſive and beautiful. Oppoſite the ſouthern front is a fine avenue, near three miles in length. Very conſiderable improvements have been effected by the preſent noble poſſeſſor; and under his direction the gardens and plantations have aſſumed a new and captivating appearance. The views are greatly embelliſhed by ſeveral pieces of water; and, on a riſing ground, is an artificial ruin, denominated the Gothic Tower. The Earl is a liberal patron of induſtry and huſbandry on his eſtate; and his Lordſhip's farming eſtabliſhment is on a very extenſive ſcale.

The village church, ſituated near the manſion houſe, was neatly rebuilt in 1749, by the Lord Chancellor Hardwicke. Four of the windows are of painted glaſs, containing the arms of the different families to whom the Yorke family are allied by marriage; and a beautiful figure of David playing on the Harp. The monument room adjoining, contains ſeveral handſome monuments of the Hardwicke family; and alſo a marble tomb to the memory of Sir Thomas Chicheley, Knt. The monument of the Lord Chancellor Hardwicke, is very ſuperb. On the upper part are medallions of the Earl and firſt Counteſs of Hardwicke; and beneath it a ſarcophagus, having on one ſide the figure of wiſdom, leaning in a mourning poſition; and on the other, the figure of Minerva. This was deſigned by James Stuart, and executed by Scheemakers. On the baſe is a long inſcription, recording the character and abilities of the Earl, and a liſt of the offices he filled with the dates annexed. He died in 1764, aged 74. The ſecond Lord Hardwicke is commemorated by an urn, with a mourning figure decking it with flowers. The monuments of the Hon. Charles Yorke, ſecond ſon of the Chancellor, and his Lady, both executed by Scheemakers, are very elegant. And one raiſed to the memory of the Right Hon. Joſeph Yorke, third ſon of the Chancellor, and Baron of the town and port of Dover; it was executed by Bacon, and is extremely well finiſhed.

The village of WIMPOLE is ſmall, and moſtly inhabited by farmers and labourers. The children of the poor are educated through the munificence of Lady Hardwicke, who has eſtabliſhed a ſchool here and in the adjoining pariſh of Whaddon. At ARRINGTON, a little village near Lord Hardwick's Park, the ſkeletons of ſixteen human bodies were found, in digging for a water courſe, within two feet of the ſurface, in October 1721. Some pieces of iron were alſo found, which ſeemed to have been parts of ſwords. Their ſituation, near Arrington bridge, induced a ſuppoſition, that they were the bodies of perſons ſlain in a ſkirmiſh to obtain poſſeſſion of the paſs during the Civil Wars.

KNEESWORTH HOUSE, the ſeat of Sir Edward Nightingale, Bart. who recovered that title but a few years ſince, is an ancient brick ſtructure, pleaſantly ſituated. At ABINGTON, is an ancient ſeat of the Pigott family. *Shepreth*, *Meldreth*, and *Triplow* are ſmall villages, containing nothing particularly worthy of obſervation; and at HASLINGFIELD, Queen Elizabeth lodged the night before ſhe made her public entry into Cambridge. On *White-hill*, about half a mile from the village was formerly a chapel, dedicated to the Virgin Mary, and much reſorted to by pious perſons.

TRUMPINGTON, a ſmall village near Cambridge, was once the reſidence of William Anſtey, Eſq. the celebrated author of the "New Bath Guide." His ſeat is now inhabited by —— Wedd, Eſq. In this village is a ſpacious manſion houſe, belonging to the Pemberton family.

On the left of the road to Gogmagog-Hills, is the pleaſant little village of CHERRY HINTON. GOGMAGOG HILLS, four miles east of Cambridge, are the highest eminences in this county. How they obtained their fanciful appellation is uncertain. Mr Layer conjectures it was the rude portraiture of a giant, which the ſcholars of Cambridge cut upon the turf, of the most elevated part, and probably named *Gogmagog*. On the top of theſe hills is a triple entrenchment with two ditches, rudely circular. This is ſuppoſed by ſome writers to have been a Britiſh, and by others a Roman camp; but it was probably occupied in ſucceſſion by both parties. Within the entrenchment, which encloſes about 13½ acres, is the houſe and grounds of Francis, Lord Oſborne, nephew to the late Earl of Godolphin. The houſe is an irregular brick building, originally intended as a hunting box; but it has with the gardens been greatly improved by Lord Oſborne. Near the centre is a ſmall fiſh pond, which is ſupplied with water by a large forcing machine, worked by horſes, that raiſes it from a well 201 feet deep. All the water for domestic purpoſes is alſo obtained from this well, there being no ſprings within a conſiderable distance.

BABRAHAM, the reſidence of General Adeane, is a neat modern building, with a ſmall, but pleaſant Park. At LITTLE SHELFORD, is the handſome manſion of William Finch, Eſq. SAWSTON, is a pleaſant village, the reſidence of the Huddleſtone family. LITTLE ABINGTON, is a pleaſant village, containing ſome neat modern reſidences; and near is the elegant houſe and park of John Mortlock, Eſq. It is a noble building, ſurrounded with delightful pleaſure grounds.

LINTON, is a market town, ſituated on the ſouth-east ſide of the county, in a very pleaſant ſpot, the grounds being more varied than in any other part of Cambridgeſhire. It conſists of ſeveral irregular streets and lanes; the houſes are principally low and covered with thatch; though ſome are very neatly built with brick. The market houſe is a ſmall ſquare building, of a mean appearance. The church is a ſpacious structure, with two aiſles, a nave, chancel, and large tower. In the ſouth aiſle is an elegant mural monument of marble, erected with a bequest of £1000. left for the purpoſe by Peter Standly, Eſq. to perpetuate his affection for his sister and benefactreſs. On the pedestal is an elegant marble urn, with the figure of Hope on one side leaning on her anchor; and on the other side, a fine female figure with a wreath and olive-branch, and a dog couching at her feet. The Sunday-ſchool in this town, which now furniſhes tuition to upwards of 100 children, was originally eſtabliſhed through the exertions of the Rev. Mr. Fiſher, the preſent vicar; and is ſupported by the contributions of the inhabitants and neighbouring gentry. The number of houſes in this pariſh is 183; and of inhabitants 1157.

CASTLE CAMPS, which originally belonged to Aubrey de Vere; Earl of Oxford, stands on a beautiful eminence. commanding an extenſive proſpect.On the east ſide was a lofty tower of brick which was blown down by the high wind in 1779. The remaining part is repaired, and made a comfortable residence for the perſon who rents it of the Charterhouſe: to which it was left with the endowments of Thomas Sutton, Eſq. The village of Castle Camps contains upwards of 800 inhabitants.

HORSEHEATH, was formerly the ſeat of William Allington; and afterwards became the property of Lord Montford; whoſe ſon, the late Lord, ſucceeded to his title and estates; but having ruined himſelf, the park was let as a farm, and the elegant manſion ſold for the materials, which have ſince been pulled down.

BALSHAM was the birth place of *Hugh de Balſham*, founder of Peterhouse in Cambridge. The village is renowned for the great revenues of its rectory, which is in the patronage of the Charter houſe.

WILLINGHAM is a large village, memorable for having been the birth place of a youth who was conſidered as one of nature's prodigies. This child when born was only a lusty boy, but rapidly increaſed in size, and diſplayed marks of puberty before he was a twelvemonth old. When he was three years of age he meaſured, three feet eight inches high, stoutly made, and had a very strong and manly voice. His weight was four stone and two pounds. His name was Thomas Hall. He was born October 30th, 1741, and died before he had attained his sixth year, with all the ſymptoms of decrepitude and old age. The particulars of his extraordinary hiſtory are inſcribed, in Latin, on a monument erected in the church.

CATLEDGE HALL, is a curious and venerable manſion belonging to the Earl of Guildford, It was erected in the reign of Henry VIII. and though much of its original ſplendour is gone, it ſtill has ſufficient charms to intereſt the feelings of the antiquary. The building is of brick and ſtone, ſtanding on a raiſed platform, ſurrounded with a moat filled with water. The entrance is from a ſmall lawn under a ſquare brick tower with four turrets; hence a flight of ſtone ſteps leads to a paved terrace, which extends to the porch. The great Hall is furniſhed with a muſic gallery and ſcreen, and has an oriel window at the upper end. The Chapel is decorated with the heads of the twelve Apoſtles, in as many compartments; and one of the windows is full of painted glaſs, finely executed. Several of the apartments are hung with tapeſtry; and in one of them according to the traditions of the place Queen Elizabeth was concealed during ſome part of the reign of her bigotted ſiſter. In this apartment, was a door leading to an octagon cloſet in a tower, from which there was an opening to the leads, where the Princeſs was accuſtomed to to take the air. The bed in this room is of crimſon velvet, with a deep gold fringe, and a chair and footſtool of the ſame pattern.

THE DEVIL's DITCH. The eaſtern part of Cambridgeſhire is interſected with ſeveral banks or ridges, and alſo by ſome deep ditches, which appear to have been boundaries againſt invasion. The moſt remarkable of the latter is called the Devil's Ditch; the etymology of which appellation may be accounted for in the name of *Davilier*, who held the manor of Broome, in Suffolk, by the ſervice of being conductor of the footmen, or infantry of that county and Norfolk, who were bound to ſerve the King in his Welſh wars, and had their rendezvous always at that ditch. This celebrated ditch commences near *Catledge*, and runs acroſs Newmarket Heath, in a straight line, for ſeveral miles, to *Reche*. The earth that was dug out of the trench is thrown up, and forms a high bank, on the east side, which is that next to the *ſea*. This mode of diſpoſing of the excavated earth, is, in the opinion of Dr. Stukeley, a proof that the ditch was made ſome centuries before Cæſar, by the firſt inhabitants that ſettled eastward, in order to ſecure themſelves from the attacks of the inland Aborigines. Its antiquity is inferred from ſeveral ways having been cut through the bank, and the ditch filled up. Theſe paſſages are moſtly called gaps.

NEWMARKET has long been celebrated in the annals of horſemanſhip for its extensive heath, which in the neighbourhood of this town, has been formed into one of the finest race courſes in the kingdom. The diverſion of horſe racing does not appear to have made any conſiderable progreſs in this country till the acceſſion of James I, when Newmarket had probably ſome kind of a racing eſtabliſhment as this monarch erected a houſe here, which was destroyed in the civil wars, but rebuilt by that diſtinguiſhed patron of the turf, Charles II. and is still the reſidence of the Sovereign whenever he viſits Newmarket.

The principal part of this town is ſituated in Suffolk, but as the whole of the race courſe is in this county, we have included a deſcription of it in the history of Cambridgeſhire. Most of the houſes are modern and well built; and many of them, which have been erected as reſidences for the nobility and gentry who attend the races, are very elegant. The town is alſo well provided with excellent Inns, coffee houſes, billiard rooms, &c. for the accommodation of its numerous viſitors during the races. Theſe diverſions are held ſeveral times in the year; chiefly during Easter, July, and October. The houſes are chiefly diſpoſed in one long and wide street, partly erected on the gentle declivity of a hill. This town has been twice destroyed by fire. The two churches here do not contain any thing remarkable; that of St. Mary, on the north ſide of the street, is in Suffolk; the other in the ſouth is in Cambridgeſhire. The inhabitants of the Suffolk diviſion are 1307, thoſe of the Cambridgeſhire ſide, only 485.

SWAFFHAM BOLEBEC was anciently poſſeſſed by the family of Bolebec, one of whom founded a Benedictine nunnery here as early as the reign of King John, ſome ſmall remains of which still exist; but the ſite is occupied principally by a modern houſe. The parochial, formerly the Nuns' church, was rebuilt about the year 1350; and dedicated by the Biſhop of Ely. This village stands in three pariſhes. The other two, which are called *Priors*, or *Little Swaffham*, and

St. Ciric, have their churches ſtanding on a high hill, in one church yard, and hence have obtained the name of *Swaffham Two-Churches.* Theſe ſtructures are built in different ſtyles of architecture, and, from their ſituation, which renders them conſpicuous at a great diſtance, become very beautiful ornaments to the adjacent country.

BURWELL is a very conſiderable village on the eaſtern ſide of the county. It became memorable from that melancholy event known by the name of the *Burwell Fire*, which from the deſtruction of lives it occaſioned, is, perhaps, unparalleled in the hiſtory of Britain. This terrible calamity is thus detailed in the pariſh regiſter: " 1727, September 8. N. B. About nine o'clock in the evening a diſmal fire broke out in a barn, in which a great number of perſons were aſſembled to ſee a Poppett-ſhow : in the barn there were a great many loads of new light ſtraw, the barn was thatched with ſtraw, which was very dry, and the inner roof was covered with cobwebs that the fire like lightning flew round the barn in an instant : and there was but one ſmall door belonging to the barn, which was cloſe nailed up, and could not eaſily be broke open ; and when it was opened, the paſſage was ſo narrow, and every body ſo impatient to eſcape, that the door was preſently blocked up ; and moſt of thoſe who did eſcape, which were but very few, were forced to crawl over the heads and bodies of thoſe who lay on a heap at the door : and the reſt, in number 76, periſhed inſtantly : and two more died of their wounds within two days. The fire was occaſioned by the negligence of a ſervant, who ſet a candle and lanthorn in or near the heap of ſtraw which was in the barn. The ſervant's name was Richard Whitaker, of Hadſtock, in Eſſex, who was tried for the fact at the aſſizes held at Cambridge, March 27, 1728 ; but was acquitted." The names of the unfortunate ſufferers are an nexed to this relation: among them were ſeveral young ladies of fortune, and many children. When the roof of the barn fell in, which was ſcarcely half an hour after the commencement of the fire, the ſhrieks and anguiſh of the helpleſs ſufferers were at once ended in one univerſal ſilence and death. The bodies were reduced to a maſs of mangled carcaſes, half conſumed, and wholly undiſtinguiſhable, and were promiſcuouſly buried in two pits, dug for the purpoſe in the church yard.

The principal beauty at Burwell is its elegant church, which is built in the gothic style of of architecture, and for ſymmetry and accurate proportions, is ſcarcely exceeded by any village church in the kingdom. It was erected about twenty years after the foundation of King's College Chapel, Cambridge, and probably by ſome of the artificers who were employed in the conſtruction of that fabric. The windows are extremely large, and have a very noble appearance; and the tower, which is embraſured, and ornamented with elegant pinnacles, adds greatly to the general effect and grandeur of the edifice.

The length of this village is nearly a mile; conſiſting chiefly of one irregular ſtreet. The houſes are built with a peculiar kind of ſtone, obtained from the neighbouring pits; and many of the incloſures in the vicinity are ſurrounded with it. The remains of an ancient caſtle are ſtill ſtanding, ſurrounded by a large foſſe. The number of inhabitants is 1250.

CHIPPENHAM PARK is the ſeat of John Tharp, Eſq. who has effected many great improvements on the eſtate. The grounds are laid out with great taſte, and the Lodges at the entrance of the Park diſplay much elegance. The manſion is built with bricks and ſtuccoed; but, with the exception of the following paintings, it contains little remarkable: St. John, a Madona, a Magdalen, and the Trinity, by Carlo

Dolci; Rinaldo and Armida, and a Magdalen, by Guerchino; and David and Goliath, by Guido.

FORDHAM was anciently the ſeat of a ſmall priory, founded in the reign of Henry III. The pariſh contains at preſent 700 inhabitants.

SPINNEY ABBEY, was the ſeat of Henry Cromwell, fourth ſon of the Protector, whither he retired after the toils of governing, (having been Lord Lieutenant of Ireland,) to end his days. In this retirement he was viſited by Charles II. when hunting in the vicinity of the Abbey, in 1671. Mr. Cromwell died, of that dreadful diſorder, the ſtone, March 23, 1674.

SOHAM, is a large irregular town, ſituated in the fens. The church is a ſpacious edifice, built in the form of a croſs, having a tower at the weſt end. The children of the poor inhabitants are educated in a large charity ſchool, under two maſters. The population amounts to 961 males, and 1043 females.

ELY.

The City of Ely is ſituated on a conſiderable eminence in the Iſle of Ely. The original ſettlement appears to have been about a mile from the preſent city, at a place called *Cratendune,* now called Cratendon Field; where, ſoon after the introduction of chriſtianity, into the kingdom of Eaſt Anglia, Ethelbert founded a church, through the perſuaſions of Auguſtine, Archbiſhop of Canterbury; but the miniſters whom he had placed there, were driven away by Penda, King of Mercia, and the place reduced to a deſart. The next attempt, which aroſe from the piety of *Ethelдreda,* daughter of Anna, King of Eaſt Anglia, proved more ſucceſsful. The iſle of Ely came into the poſſeſſion of Etheldrida, by the death of Tonbert, her huſband; and, having refuſed to aſcend the throne of her ſecond huſband Egfrid, King of Northumberland, ſhe retired to the iſle of Ely, and began to erect a monaſtery where the city now ſtands, about the year 673, and ſoon aſſembled a numerous congregation of religious perſons. On her death, ſhe was buried, by her orders, in the common cemetery of the Nuns; but her body was removed ſixteen years afterwards into the church and depoſited in an elegant marble coffin. She was regarded as a ſaint for many centuries; and various miracles were attributed to her ſanctity, after her death. This monaſtery flouriſhed till about the year 870, when it was diſcovered by the Danes, who put its peaceful inhabitants to the ſword, and burned the church and buildings.

Beorhed, King of Mercia, annexed the juriſdiction of the iſle, and the revenues of the monaſtery to the Crown; which retained them till the reign of Edgar, who, by agreement with the prelate, reſtored the ancient monaſtery to the Biſhop of Wincheſter. From this period to the time of the conqueſt the Abbey flouriſhed greatly; when during the confuſion that enſued, it was deprived of many eſtates; and Thurſton, the Abbot, being fearful its whole poſſeſſions would be ſeized by the Conqueror, reſolved to ſupport the intereſt of Edgar Atheling, and gave ſhelter and aſſiſtance to ſeveral Engliſh Lords, that were determined to defend their country from one whom they regarded as an uſurper. William, commanded the aſſailants in perſon, and after many unſucceſsful attempts to enter the iſland, was obliged to deſiſt, and proceeded to Cambridge, where he alienated all the eſtates and manors of the monaſtery, ſituate without the Iſle, to his Norman followers. This was the ſureſt mode of extorting the ſubmiſſion of the monks; but, ſurrounded as they were by the Engliſh Officers they dared not offer to make terms with the King, therefore the Abbot with ſeveral of the monks left Ely privately, and ſued for pardon of William. In the enſuing year, the King marched againſt them a large army, and after great ſlaughter, victory was declared for the King; who pardoned the monks through the interceſſion of Gilbert, Earl of Clare. The foundation of the magnificent conventual church was laid, about 1081, by Simeon, then Abbot of Ely; but it remained unfiniſhed at the time of his deceaſe, and the eaſt ſide was completed by his ſucceſſor Richard, in the year 1106. This Abbot ſolicited Henry I. to eſtabliſh a Biſhopric here; but the deſign was not effected till after his death, in 1107. Hervey, Biſhop of Bangor, was the firſt appointed to the new See. Henry VIII. granted a charter, in 1541, to convert the conventual church into a cathedral; the eſtabliſhment for the performance of divine ſervice, to conſiſt of a Dean, a Prieſt, and 8 Prebendaries, with other miniſters. The Biſhop poſſeſſes all the rights of a county Palatine, and is Sovereign within the Iſle, where all cauſes are heard and determined by a Judge of his appointing, who holds aſſizes, gaol delivery, and quarter ſeſſions.

The CATHEDRAL is the workmanſhip of very different periods, and diſplays a ſingular mixture of various ſtyles of architecture; yet, conſidered as a whole, it muſt be regarded as a very magnificent ſtructure. The north and ſouth tranſepts are the oldeſt parts of the edifice, and were erected in the reigns of William Rufus and Henry I. Here the arches are circular, as well as in the nave, which was began during the reign of the latter monarch, and completed before 1174. Between this period and the year 1189, Biſhop Rydel erected the great weſt tower; the interior view of which is particularly beautiful, it being decorated with ſmall columns and arches running round in ſeveral ſtories, and lighted by 27 windows. The lower part was repaired, and new caſed with ſtone, in the middle of the fifteenth century; but the beauty of the tower was deſtroyed in a conſiderable degree, by the inſertion of a belfrey floor, and various irregular beams. Theſe have been lately removed through the munificence and taſte of the Right Rev. James Yorke, the preſent Biſhop. who has alſo enabled the Dean and Chapter to repair the mutilated decorations of the tower, and restore the whole to its original ſplendour. The handſome Vestibule at the entrance, was built about the year 1200, by Biſhop Eustachius.

The foundation of the elegant ſtructure which now forms the Choir, but was originally the Preſbytery, was laid by Hugh Northwold, the eighth Biſhop, in 1234, and finiſhed in 1250. The three moſt weſtern arches were deſtroyed by the fall of the lofty ſtone tower in 1322. This tower stood in the centre of the building, on four arches, which gave way, and precipitated it to the ground. To prevent the recurrence of a like accident, Allan de Walſingham, Sub-prior of the convent, deſigned and erected the preſent octagonal tower, which is ſupported on eight pillars, covered with a dome, and terminated by an elegant lantern. The capitals of the pillars are ornamented with rude historical carvings, which repreſent the principal events in the life of Etheldreda. The whole of this elegant octagon was finiſhed in the year 1342. The three arches eastward of the octagon were rebuilt about the ſame period. The vaulting is divided into regular compartments, by various ribs, which ſpring from the capitals of the pillars, and are ornamented at the interſections with flowers and elegant foliage, executed with great ſkill. The arches of the ſecond arcade, and the windows above them, are decorated with graceful and delicate tracery work, The wood-work of the dome, &c. was repaired, between the years 1757, and 1762, by Mr. James Eſſex, of Cambridge; and the choir, which was then under the Lantern, was alſo removed, by his direction, to its preſent ſituation. The stalls in the new choir were originally made by Allan de Walſingham; the east window is embelliſhed with a good painting of St. Peter; and the altar-piece is a fine old painting, repreſenting St. Peter delivered from priſon, by the Angel. At the east end of the north aiſle is a ſumptuous chapel, erected by Biſhop Alcock, who died in 1500. His tomb is placed in the chapel. In the ſouth aiſle, and in ſome reſpects correſponding with the former, but much ſuperior in its embelliſhments, is another chapel. This was erected by Biſhop West, about the year 1530, and is highly enriched with delicate Gothic ornaments. In the aiſles are the remains of ſeveral ancient monuments, chiefly of the Biſhops who have filled the See, but theſe are now much defaced. The Font is of very elegant worked marble, adorned with ſmall statues.

The extreme extent of the Cathedral, from east to west, is 535 feet; but the interior length is only 517. The length of the tranſept, is 190 feet; the height of the lantern 170; the extreme height of the western tower 270; and of the two towers on the ſouth, 120 feet.

Near the east end of the Cathedral, is St. Mary's Chapel, now Trinity Church. This elegant structure was commenced in the reign of Edward II. and is one of the most perfect buildings of that age. The interior length is 200 feet, the breadth 46, and the height of the vaulted roof 60. This building has neither pillars nor ſide aiſles, but is ſupported by strong ſpiring buttreſſes, ſurmounted with pinnacles.

The Cloisters and other buildings of the monastery, have been long ſince demoliſhed, except the refectory, which has been converted into the Deanery; and an elegant little chapel, built by Prior Crauden, now inhabited by the Rev. Lewis Jones. The western gate of the college, or the *Ely Porta*, is still standing; it is of brick, with battlements and low towers.

The *Biſhop's Palace* is a neat brick ſtructure. It was built by Biſhops Alcock and Gooderich, and was greatly improved by the late Biſhop Keene. It is very commodious, and fitted up in an elegant ſtyle.

Here is a Grammar School appendant to the Cathedral, for the education of 24 boys; and a Charity School for the ſame number. The police of Ely is regulated by the Magiſtrates who are appointed by the Biſhops, and are Juſtices of Peace within the Iſle. Theſe meet on buſineſs every market day, which is on Thurſday. This city is the only one in England not repreſented in Parliament. The ſtreets are irregular, the market place ſmall, and the houſes in general ancient, though ſome are neatly built with ſtone. The population amounts to 1765 males, and 1948 females.

SUTTON is a large village, containing a very elegant church; which ſtands on an eminence. It has a beautiful ſquare tower, on which are two octagon ſtories, adorned with carving, and terminated with a ſpire.

CHATTERIS is a very large and populous village, containing upwards of 2000 inhabitants.

MARCH is an extenſive hamlet, ſituated on the banks of the river *Nene*, The church is an elegant and ſpacious edifice. A number of coins and other Roman antiquities have been diſcovered in digging near this place.

THORNEY is a ſmall market town, extremely well ſituated. In the year 1085 the ancient church was taken down, and a new one was commenced by the Abbot Gunter; this structure was extensive and magnificent, but when the abbey was diſſolved, great part of it was destroyed; and the rest was ſpared on it being made parochial. The aiſles were removed in 1636; and the nave, which is 66 feet long, and 28 broad, was repaired, and fitted up for divine ſervice. Some remains of the Abbey cloisters are ſuppoſed to constitute part of the ſchool-houſe. The number of inhabitants in the pariſh is about 1300.

WISBECH.

The moſt northern town in Cambridgeſhire, and the ſecond in conſequence, derived its name from the river Ouſe, or Wis, which flows through it, and falls into the ſea about eight miles off. In 1071, King William built a Caſtle here, which was probably diſmantled in the reign of Henry II. as it appears that a new Caſtle was erected on its ſite, by Morton, Biſhop of Ely, which became the Biſhop's Palace. On the abolition of Hierarchy, it was purchaſed by John Thurloe, Eſq. afterwards Secretary of State to the Protector. This gentleman rebuilt it in its preſent form from a deſign of Inigo Jones. It belongs at preſent to Joſeph Medworth, Eſq. who has removed the detached buildings, and erected ſeveral rows of elegant houſes on the premiſes.

The church, dedicated to St. Peter and St. Paul, is a ſpacious and handſome fabric, though of ſingular conſtruction, it being furniſhed with two naves and two aiſles. The naves are lofty, and ſeparated from each other by a row of light ſlender pillars, with pointed arches; the aiſles are the moſt ancient, being divided from their reſpective naves by low, maſſy pillars, and Saxon arches. The tower is extremely beautiful. On the weſt ſide of the north entrance is a ſmall chapel, or chantry, dedicated to St. Martin. In this church are a number of handſome monuments; and likewiſe a very fine Organ, built by ſubſcription in 1789.

The Corporation of Wiſbech conſiſts of ten Burgeſſes; their executive officer is the Town Bailiff, who has the entire management of the eſtates and affairs of the Corporation. The charter of incorporation was renewed in the year 1669. Theſe Burgeſſes have no connection with the juriſprudence of the town, nor have they any degree of civil authority: their principal buſineſs is to regulate the management of the eſtates bequeathed for public or charitable uſes. The government of the town is included in the Magiſtracy of the Iſle of Ely; the aſſizes and quarter ſeſſions are held by turns at Ely and Wiſbech.

The trade of Wiſbech, which has much increaſed of late years, is now very conſiderable. The principal articles of traffic are coals, corn, timber, and wine: the average of the exports and imports amounts to 40,000 tons annually. The market is abundantly ſupplied with poultry, fiſh, and butcher's meat; and the trade of the town is further promoted by ſix annual fairs, for horſes, cattle, flax and hemp.

Many improvements in the buildings have been made within the laſt forty years; the chief of which are, an elegant ſtone bridge, over the great river, erected about the year 1767, at the expence of nearly £2300. It conſiſts of one elliptical arch, accurately proportioned. A new Cuſtom-houſe is alſo now erecting, at the charge of the Corporation. The ſtreets are tolerably well paved, lighted, and watched; the buildings are in general neat and modern, and ſome few are very elegant; and when the Corporation have completed the Cuſtom-houſe, and erected new ſtructures in the room of the ancient Shire hall, and Butchers' Shambles, but very few towns will be more handſome.

The Theatre, in nearly a centrical ſituation, is a ſmall but very neat and convenient building: and the performances are ſuperior to thoſe of the generality of ſtrolling actors. Wiſbech alſo poſſeſſes an excellent Literary Society, inſtituted in 1781; their Library, which is well ſelected, contains upwards of 1900 volumes. The education of youth is provided for by a Free-ſchool, and two Charity-ſchools, ſupported by voluntary contributions.

The ſectaries from the eſtabliſhed church are numerous; conſiſting chiefly of Quakers, Anabaptiſts, Methodiſts, and Culymites: each of which ſect are provided with a Meeting-Houſe. The population of Wiſbech, as aſcertained by the late act, amounts to 4710.

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(2)

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BEING

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OF THE

PRINTED QUESTIONS

PROPOSED TO THE

CANDIDATES for the Degree of Bachelor of Arts,

AT THE

GENERAL EXAMINATIONS,

From the year 1801 *to the year* 1810 *inclusive.*

WITH A PREFACE

BY A

GRADUATE of the UNIVERSITY.

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Cambridge, *Oct.* 25, 1810.

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REPEATED favours demand repeated acknowledgements. The Publisher of the CAMBRIDGE PROBLEMS *eagerly seizes the present opportunity, to declare his obligations to the kindness which he has again experienced from the gentlemen whose names are prefixed to the papers which compose the following volume. By their liberal concessions, he has been enabled to present to the public, a compleat collection of all the Printed Questions that have been proposed to the candidates for the degree of Bachelor of Arts, at the General Examinations, during the last ten years.*

Respect for the labours of those gentlemen and a desire that no difficulty, which diligence might prevent, should retard the efforts of students in the university, alike required that the questions should be given with all possible accuracy. Notwithstanding the pains that have been bestowed in revising the proof sheets, some errors have been discovered. Let it be pleaded in extenuation, that, during the time in which a great part of the work was printed, the corrector of the press resided at a considerable distance from Cambridge.— Should any errors occur, beside those which have been pointed out, they will not often, it is hoped, be the cause of obscurity.

PREFACE.

THE collection now presented to the public may, it is presumed, not unfairly lay some claim to utility. The labours of those learned persons, to whom is confided a most arduous and important charge, may, by being thus brought together, have secured to them that preservation which they surely merit: the attentive student may have ample means of exercising his ingenuity, and of acquiring a facility of investigation which may finally command success: and, while the purposes of Academical education are more immediately regarded, the general interests of science may not be totally overlooked.

These are, it will be allowed, important objects. One good effect, however, may be produced, to which circumstances, not very honourably marking the times, irresistibly direct our attention. *The public at large may be enabled to form some opinion of the nature and extent of the* MATHEMATICAL *and* PHILOSOPHICAL KNOWLEDGE *which a Candidate for University honours is expected to have attained.* Let this matter be a little farther considered.

All thinking persons will acknowledge the mighty influence, on the most important concernments of this country, which must ever be possessed by our universities, when flourishing in well-deserved reputation. Their spreading fame will then only, by men of good principles, be contemplated with perfect satisfaction, when the conviction is firm, that their fame is merited. Such men will be anxious that the grounds of their high and prescriptive claims to public confidence should be clearly understood. If, in the opinion of some persons, it should appear that those grounds are not, in all instances, entirely unobjectionable, they will still feel that the dignity of the institutions should protect them from intemperance of abuse. They know, indeed, that the censures of ignorance are uncontrolled by decorum, as its applauses are unsanctioned by discrimination. Yet however unworthy of attention they may consider the coarse and deafening clamour of illiterate malignity, their indignation will be roused, when, amid the vulgar growl, tones may be distinguished that can only be the effect of cultivation and refinement. That indignation will be heightened into horror, when they behold abilities which might excite admiration employed in furnishing arms to the violent and undisciplined, and leading them on to the attack of those hallowed fortresses which have been, for ages, the safeguards of all learning.

The University of Oxford, which, amid the din of obloquy on Academical establishments with which we have been stunned, had the greatest cause of complaint, has been very ably vindicated by one of her own sons: a man of fine talents and scholar-like attainments. His elevated views, his affectionate zeal, and the deep sense, which he discovers, of the importance of the cause in which he is engaged, draw forth our warmest approbation; more particularly, when we turn, disgusted, from the illiberal malevolence and unfeeling levity of his antagonists.

Let not our calumniators exult. If *we* have been silent, it is not from apprehension. No formal reply to their mis-statements is, even now, intended. The volume thus introduced to public notice appears to contain a compleat refutation of the main objection that has been advanced against the course of study laid down in the University of Cambridge. Amid mis-representations, which many are delighted to believe, and which the generality are unable to detect, it is as pleasing as it is important to have the power of referring to an authentic document; which, in the opinion of all competent judges, will amply vindicate the economy of that illustrious seminary.

It has been urged, that, in the system of education established at Cambridge, "the invention finds "no exercise; the student is confined within narrow "limits: his curiosity is not roused: the spirit of "discovery is not awakened." Now, let the following collection of questions, derived from almost every department of Mathematical and Philosophical learning, be examined by any person who is conversant with such subjects: let him be informed, that the student has continually before him, the time when his knowledge will be brought to the test, and when his inventive powers will be exercised in the solution of problems, such as are there presented, with which he cannot be previously acquainted: that he is incessantly stimulated by every consideration that acts most forcibly on the mind of youth,—the dread of failure—the ambition of distinction—the prospect of consequent emolument—and, the hope of future success:—let him then say whether it is possible that, under such circumstances, the energies of genius can remain inactive.

To come yet more closely to the point. Let this great master of the δυναμις ευρετικη (*Caledonicè* ευρητικη! Ed. Rev.) from whom this objection proceeds, before he composes his next declamation against the University of Cambridge, amuse himself, some evening, with solving the questions contained in one of the papers for the higher classes in the ensuing collection. Let him take, for instance, the paper by *Mr. Sowerby (page 78); which is particularized to avoid the obvious unpleasantness of selecting from the productions of the living. Or, if this requisition should be thought too troublesome to be acceded to, and the objector be, as report says, a Professor of Natural Philosophy, let him place that paper, for two hours, before his most favourite pupil, at the close of his studies. Let him examine his investigations and tell us the result. We will be very candid: we will take the Professor's word for the number of problems of which the solution may be effected; and his judgment for the legitimacy of the methods and the truth of the results. Let us hope that so fine an opportunity will not be neglected; and that we shall soon witness a grand display of the analytical powers of a mind instructed, of course, according to his own principles, to despise the synthesis of Newton, and to operate with the calculus of the sines. We will, in the mean time, content ourselves with predicting that, whatever calculus may be employed, the student will not have to complain that his inventive powers were left unexerted.†

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* *Μετέβη δ'ἐς ἀμείνονα χῶρον!!* The University has had to lament the death of this valuable person, who sunk under a decline in the the prime of life. Many, to whom he was endeared by whatever is amiable in manners, will cherish the remembrance of him with unabating affection. It would be an easy, and, to the writer of this note, a pleasing task, to dwell upon the mildness of his virtues, the rectitude of his principles, the vigour of his faculties, and the extent of his attainments. This is not, however, the proper place for a delineation of his character.

For what has been said, no apology will be offered, even should these observations be deemed somewhat out of season. Who will venture to condemn that feeling which arrested the mind at the recollection of a much-respected name, and bade it pause, for a moment, to muse on moral and intellectual excellence prematurely lost? Who would not be mortified by the reflection that a man such as HE is known to have been, was permitted to depart without one public tribute to his memory?

It has been already observed, that a systematic reply to objections is not, on the present occasion, to be expected. The most formidable of our adversaries has, however, been fairly met. Is it too much to presume that the attack has been somewhat more than repelled? Let the enemy look to himself.—Were it worth while to become the assailants, is it quite certain that his own entrenchments are absolutely impregnable?

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† We would relieve the distress which the objector seems to feel, when describing the fancied labours of our Under-graduates, by assuring him that no "young man studying mechanics is compelled to get by "heart the whole of the heavy and verbose demonstrations contained in "Keil's Introduction." It is highly probable, however, that the objector and the present writer would differ materially as to the books which they might recommend to "a young man studying mechanics."

A wild and unexampled hostility to established discipline is that harsh characteristic of the times which rendered it highly desirable that whatever was advanced in defence of it should consist of something more substantial than general assertions and metaphysical reasonings. While the advocate for University education can appeal to such FACTS as are presented in this book, we may rationally hope that credulity itself will not be widely misled. In what Academical institution, it may be asked, beside the University of Cambridge, are the Philosophical attainments of the students, of an order high enough to admit of discrimination, by methods such as the subsequent pages exhibit?

INVENTION—GENIUS—THE PHILOSOPHICAL SPIRIT—these rare and splendid endowments are destined for ascendancy wherever they appear: and wretched indeed would be the policy of that plan of instruction which should fail in vindicating to them their natural superiority. But by far the largest portion of intellect, on which education has to operate, consists of that which is capable of the reception and retention of truths fairly presented to it: which, by diligent observation, acquires moderate notions of the application of which those truths are susceptible, and, by practice, a useful faculty of accomplishing that application. The principles by which a system of truly liberal and effectual education ought to be guided, may, from these considerations, be deduced with sufficient distinctness and certainty. It will be rigorously demanded that truths important in themselves, legitimately deduced, and well-connected with each other, become, by unwearied reflection on their proofs and dependencies, as familiar with the student as the first principles of human knowledge: and opportunities will be afforded, by regular gradations of difficulty, for the employment of these truths in the investigation of new ones. There must be much that industry may secure, and something that genius may grasp after. By inflexibly requiring that knowledge should be thus combined with its application, genius will be taught the wholesome necessity of study, and industry may be stimulated to the exercise of invention.

The truths of Natural Philosophy appear to form the best ground-work for Academical education.— The information which they convey is of incalculable importance; they are regularly derived from the simplest notions; and the application of which they are capable is boundless as the universe.

From the ardour natural to youth, it is greatly to be feared that the knowledge of facts will be deemed all that is necessary for future enquiries.— This knowledge might be obtained from the bare enunciation of propositions, or from a table of contents. A just taste in Philosophy can only be acquired by a profound and scrutinizing attention to the *methods* adopted by the great Masters of Science. It is not enough that a student has gone through a demonstration, or that he has verified every step.— He must dwell upon it, till the whole can be surveyed, as it were, at one glance. He must stay to estimate the value and tendency of the proposition, and to contemplate the situation which it holds in the general system. It is only by such cautious proceeding that his acquirements can be, at once, solid and permanent, and dignified and effective. All this is true, whether the study of Mathematical Philosophy be pursued for its own sake, or as a discipline by which the mind is strengthened and enlarged. In times marked by self-confidence and disdain of labour, it cannot be unseasonable to assert the necessity of regular advancement; and to assure the most undoubting genius, that he is not doomed to light, at one bound, on the top-most pinnacle of science.

To those who are unacquainted with the examinations which the Candidates for the degree of Bachelor of Arts must necessarily undergo, it may not be improper to state, that those examinations last for the space of five days: that, for the purpose of ascertaining the relative proficiency of the candidates, demonstrations of questions, involving the principles of the most important parts of pure and mixed mathematics, are expected to be compleatly drawn out: and that the papers under each year, in the following collection, constitute a very small part of the whole examination; three hours only, on each of the two first days, being appropriated to them.*

It will not be expected, by considerate persons, that *all* the ensuing propositions should be new and important. Many of them present truths of real and intrinsic value. The purpose, however, for which they were constructed would probably be thought to be sufficiently attained, when an example was afforded of the combination and application of known principles.

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* Let it be observed, that in this account of University discipline, the highest classes are chiefly referred to; and that mention of the examinations in Moral Philosophy and Metaphysics is purposely omitted.

Great discrimination and judgment must evidently be demanded in adapting the questions to the circumstances under which their solution is expected. Considerable diversity, it should appear, is desirable, both as to the sources from which they are derived, and to the difficulty which they involve. The intentions with which they are given will be equally frustrated when the principles of solution are too obvious and simple, and when they are too remote, or too difficult of application. Such, it must at the same time be admitted, is the influence of favourite pursuits on the human mind, that it would not be easy to select an instance in which, in the unanimous opinion of the learned, the practicable exercise of ingenuity had, through an entire paper of questions, been successfully kept in view.

Haste can never be accepted as an apology for incorrectness, except when revision is impossible.

This preface, which must now terminate, was undertaken at the request of the publisher, when the volume which it announces was on the verge of publication. Let the unavoidable rapidity, with which it was drawn up, atone, in some degree, for the many imperfections, both in sentiment and expression, which it must undoubtedly exhibit. Let it be considered as the sudden effusion of one who is more accustomed to thinking than to writing; who is not wholly unacquainted with the principles of just composition, and who does not wish to be quite inattentive to them. In full consciousness that rudeness was not designed, the hardihood of right intention has not been solicitously restrained. The motives which prompted the foregoing observations, will, it is confidently expected, be contemplated with unalloyed satisfaction, even in moments of the most serious reflection; and the manner in which they are offered will not, it is hoped, be surveyed with very troublesome discontent. To have vindicated the cause of good learning must always afford a subject for exultation; and bad indeed must be that method of procedure, which can overbalance all the merit arising from the exposure of misrepresentation.

CAMBRIDGE PROBLEMS,

1801.

Morning Problems.—Mr. Hornbuckle.

FIRST AND SECOND CLASSES.

1. COMPARE the velocities acquired in falling freely from different altitudes towards *different* centers of force, the law of force being the inverse square of the distance.

2. Investigate the equation to the reciprocal spiral, and thence determine the law of the force by which a body may describe the curve.

3. Let a given parabola be just immersed vertically in a fluid; at what distance from the vertex must a line be drawn parallel to its base, that the pressure on the upper part may be to that on the lower in the proportion of m to n.

4. A body falls freely by the force of gravity down AB, and uniformly describes the space BD, equal to twice AB, on the horizontal plane, with the velocity acquired. Determine, geometrically, the length and inclination of a plane drawn from A to BD, the time down which may be equal to the time down AB and along BD.

5. Divide a given angle into two angles, whose tangents shall be to each other in a given ratio.

6. On a given day in a given latitude the length of the shadow cast by a tower at 12 o'clock was (a) feet. Required the height of the tower.

7. Find the length of an arc of the meridian corresponding to any given latitude, according to Mercator's projection, and reconcile it to the construction given by Cotes.

8. Where must an eye be placed that an object, seen through a double convex lens, may appear of the same magnitude at all distances from the lens.

9. A body is projected from the top of a given inclined plane. Required the direction of projection in which the least velocity will bring it to the bottom of the plane. Required also this velocity.

10. Compare the values of the respective infinite series $1+2x+3x^2+4x^3+$ &c. and $1-2x+3x^2-4x^3+$ &c.

11. Compare the chances of throwing an ace in two trials with one die, and in one trial with two.

12. Transform the cubic $x^3-px^2+qx-r=0$, whose roots are a, b, c, into one whose roots are $\frac{1}{a+b}, \frac{1}{a+c}, \frac{1}{b+c}$.

13. Any two sides of a spherical triangle remaining constant, determine the ratio of the nascent increments of the angle included between those sides, and of either of the other angles.

14. Suppose a given sphere to be projected in a medium whose density is $\frac{1}{3}$ that of itself; compare the velocity of projection with that remaining in the

sphere after describing a space equal to eight diameters, the resistance to the motion arising only from the inertia of the medium.

Third and Fourth Classes.—Mr. Hornbuckle.

1. Required the price of paving a floor, whose length is 10yds. 2ft. and breath 5yds. 1ft. at 2s. per square foot.

2. Reduce 17*s*. 9½*d*. to the decimal of a pound.

3. Prove the rule for finding the greatest common measure of two quantities, and reduce $\frac{216}{3186}$ to its lowest terms.

4. If an angle of a triangle be bisected by a line which also cuts the base, the rectangle under the sides of the triangle is equal to the rectangle under the segments of the base, augmented by the square of the bisecting line.

5. Given the three angles of a triangle and the radius of the circumscribing circle, to find the sides.

6. The sum of the tangents of two arcs : diff. of tangents :: the sine of the sum of those arcs : sine of the difference.

7. Prove that a body cannot easily be balanced on a point under the center of gravity.

8. Given the length of a pendulum (l) that oscillates seconds, find by means of it how far a body will fall freely by the force of gravity in t''.

9. Given the velocity and direction of projection, find the range on a plane of given elevation, and the greatest altitude.

10. Find the fluxions of the following quantities $\frac{x}{\overline{a^2-x^2}|^{\frac{1}{2}}}$, $\frac{\sqrt{a^2+x^2}}{\sqrt{a^2-x^2}}$, a^x, a being constant.

11. Inscribe the greatest cone in a given sphere.

12. Find the chords of curvature perpendicular and parallel to the axis at a given point of the common parabola.

13. The roots of the cubic $x^3-px^2+qx-r=0$ are in musical progression, shew how they may be found.

14. Find generally the sums of the powers of the roots of an equation.

15. Explain the principle of the hydrometer, and shew that if it be made to sink to the same depth in different fluids, the specific gravities of these fluids are as the weight of the instrument in the several cases.

16. Find the center of a Meniscus, and prove it to be a fixed point.

17. Place an object before a double convex lens, so that the image may be double of the object, and erect.

18. Given the right ascension and declination of a star. Required its latitude and longitude.

19. Supposing the earth's orbit a parabola, find the apparent path of aberration of a fixed star parallel to the ecliptic.

20. The velocity at any point of a conic section : velocity in a circle at the same distance :: $\sqrt{\frac{1}{2}L \times SP}$: SY; Prove this, and shew it to be the same ratio as that of $\sqrt{HP} : \sqrt{AC}$, AC being the semi-axis major.

21. How far must a body fall internally to acquire the velocity in a parabola, the force varying inversely as the square of the distance?

22. Compare, by means of a circle, the times of describing freely different spaces from the same distance towards the same center of force, the law of the force being the inverse square of the distance.

23. Explain the principle of Cassegrain's telescope, and find its magnifying power.

24. Sum the following series $1.2.4+2.3.5+3.4.6+$ &c. to n terms.

Also $\frac{1}{1.3}-\frac{1}{2.4}+\frac{1}{3.5}-\frac{1}{4.6}+$ &c. ad inf.

Fifth and Sixth Classes.—Mr. Hornbuckle.

1. $17\frac{1}{2}$ ells of cloth, each containing 5qrs. cost £6. 17. $10\frac{1}{4}$; how much will 18 yards cost at the same rate.

2. Required the interest due on £115. for $5\frac{1}{4}$ years at $4\frac{1}{2}$ per cent. per ann. simple interest.

3. Solve the following equations

$$\sqrt{x}-4=\frac{259-10x}{4+\sqrt{x}}.$$

$$\frac{10}{x}-\frac{14-2x}{x^2}=2\frac{4}{9}.$$

4. In any plane oblique angled triangle, given two sides and the included angle, to solve the triangle.

5. A body falls from rest by the force of gravity down a given inclined plane; compare the times of describing the first and last halves of it.

6. Prove the velocity in any point of a parabola equal to that acquired in falling down $\frac{1}{4}$ the parameter.

7. Given a rectilinear object, and its inclination to a known refracting surface; required the magnitude and inclination of the image.

8. Prove that the image of a strait line before a spherical reflector is the arc of a conic section.

9. Find the time of emptying a cylinder of given base and altitude through a small orifice in its base· and investigate the fluxional expression for the time of emptying vessels in general.

10. If all the coefficients of an equation be whole numbers, shew that it cannot have a fractional root.

11. Draw a meridian line on a horizontal plane.

12. Compare the velocity in a curve with that in a circle, at the same distance, in general, and in the conic sections; the center of force being in the focus.

Evening Problems.—Mr. Walker.

1. Find the exact value of .1666, &c. of a £.

2. Find the length of a pendulum that would oscillate seconds at the dist. of the earth's rad. above its surface; and then determine the point below the surf. where it would oscillate in the same time.

3. A body, projected from the top of a tower at an angle of 45° above the horizontal direction, fell in 5″ at a dist. from the bottom of the tower equal to its altitude: find that alt. in feet.

4. Compare the resist. upon the curve of a semicircle, moving in a fluid in the direction of its axis, with the resist. upon its base.

5. Two equal hollow cubes are immersed in water, having a side parallel to the surface, and their depths are in the ratio of 4 : 1; compare the times of filling through equal orifices in the bottoms.

6. What must be the form of a glass lens placed in water, that all rays, incident parallel to its axis, may converge accurately to one point within the water?

7. The reflecting curve is a semi-circle, and rays fall parallel to its axis: construct the caustic; and compare the density of the rays at different points.

8. Given the sun's alt. at 6 o'clock, and the alt. when due east; find the lat. of the place.

9. Given the *mean* horary motion of a planet in its orbit; shew the method of finding the horary motion in longitude.

10. The hyp. logarithm being given, find the corresponding number.

11. Sum the series $\frac{2}{1.3} \times \frac{1}{3} + \frac{3}{3.5} \times \frac{1}{3^2} + \frac{4}{5.7} \times \frac{1}{3^3} +$ &c. ad inf.

And $1.2.4 + 3.4.6 + 5.6.8 + 7.8.10 +$ &c. to n terms, by increments.

12. Shew the method of finding the content of a pyramid, whatever be the figure of its base; the area of the base, and alt. of the solid, being given.

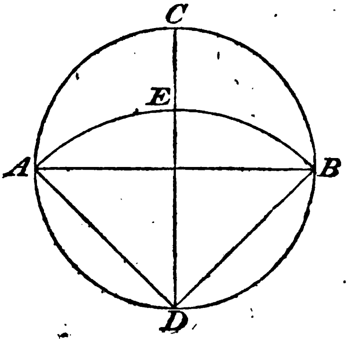
13. Investigate the ratio of the centripetal and centrifugal forces in any curve; and apply it to the hyperbolic spiral.

14. Find the actual vel^y. and per. time, of a body revolving in a circle, at the dist. of the earth's rad. above its surface.

15. The equation to a certain curve is $y = \frac{4x^2}{\sqrt{a^2 - x^2}}$, where x is the absc. and y the ord.: find the whole area of the curve, and shew that it = area of a circle whose rad. is a.

16. Shew the method of comparing the mean addititious force of the sun upon the moon, with the force of gravity at the earth's surface.

17. Let AB and DC be two diam. of a given circle, drawn at right angles to each other; AEB a circular arc described with rad. DB or DA : prove that the area of the lune $AEBC$ = area of triangle ADB.



18. Suppose a comet, in its descent towards the sun, to impel the earth from a circular orbit, in a direction making any acute angle with the earth's dist. from the sun; and the vel^y. after impact : vel^y. before :: $\sqrt{3} : \sqrt{2}$: find what change would be produced in the length of the year.

19. A globe and its circumscribed cylinder revolve uniformly round a common axis in the same time: compare the motion of the cylinder with that of the globe.

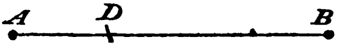
20. Shew that the fluent of $\frac{\dot{x}}{x}\int\frac{\dot{x}}{1+x}$, generated whilst x from 0 becomes 1, is $=\frac{\mathcal{Q}^2}{3}$, where $\mathcal{Q}$ is the quad. arc of a circle whose rad. is 1.

21. A body descends in a parabola in a resisting medium, by a force tending to the focus, which $\propto \frac{1}{\text{dist.}}$: compare the resist. with the centrip. force: and find the law of the velocity.

22. The relation between the abscissa and ordinate of an algebraic curve is expressed by the equation $y^n - \overline{a+bx}.y^{n-1} + \overline{c+dx+ex^2}.y^{n-2} -$, &c. $= 0$: prove that the sum of the ordinates divided by the respective subtangents, is a constant quantity.

23. A cylinder of a given weight and dimensions, is put in motion round an axis parallel to the horizon, by a given weight (P) suspended by a small string wound round the surf. of the cylinder: find the actual time in which *P* would descend from the surf. of the earth to the center.

24. Let *A* and *B* be two particles of matter, connected by an inflexible line *AB*; and let a force be impressed perpen. at any point *D* which is not the center of gravity: find the point of initial spontaneous rotation; and then determine the path of that point in one revol. of *A* and *B*.



Morning Problems.—Mr. Walker.

FIRST AND SECOND CLASSES.

1. An equiangular prism is placed upon an inclined plane with its axis parallel to the horizon, and is just supported: — find the plane's inclination.

2. A cylinder is just immersed in a fluid with its axis perpendicular to the surface; find at what point it must be cut by a plane perpendicular to its axis,

that the pressures upon the convex surfaces may be equal.

3. Prove that a small rectilinear object and image subtend equal angles at the vertex of a spherical reflector.

4. The latitude being given, find at what time on the longest day, the variation of the sun's altitude is greatest.

5. Given the moon's horizontal parallax and periodic time, with the sun's apparent ½ diameter and length of a sidereal year; shew the method of comparing the densities of the earth and sun.

6. $a\dot{z} = \dot{y}\sqrt{a^2+4y^2}$, where z is the arc of a certain curve, and y the ordinate; determine the relation between the ordinate and abscissa.

7. Prove that the solid generated by the revolution of an ellipse round the minor axis, is a mean proportional between the solid generated round the major axis and its circumscribed sphere.

8. Find the distance of the point of suspension from the center of gravity of a given system of bodies, that the time of an oscillation may be the least possible.

9. Investigate and construct Cotes's fifth spiral.

10. The moon performs a revolution round the earth in a certain period, whilst they revolve round their common center of gravity; in what ratio must the mean distance of the moon be diminished that it may revolve round the earth at *rest*, in the same time?

11. Describe the curve which is the locus of the equation $x^4 - a^3x^2 + a^2y^2 = 0$: and find its whole area.

12. Find the fluent of $\frac{\dot{x}}{\overline{1+x^2}|^2}$, having given the fluent of $\frac{\dot{x}}{1+x^2}$: find also the fluent of $v^2x^3\dot{x}$, where $v =$ hyp. log. x.

13. Prove the differential method of summing series, by the method of increments.

14. Find the attraction of a corpuscle to a sphere, when the attractive force to each particle $\propto \frac{1}{\overline{\text{dist.}}|^3}$.

Third and Fourth Classes.—Mr. Walker.

1. Find the interest of £555. for 2½ years, at 4¾ per cent.

2. A piece of ground, containing 4970.25 square yards, is to be laid out in the form of a square: find the length of a side.

3. Given $x + \sqrt{a^2 + x^2} = \frac{2a^2}{\sqrt{x^2 + a^2}}$: find x.

4. Prove that the ratio $\sqrt[m]{1+x} : 1$ is nearly equal to the ratio $1 + \frac{x}{m} : 1$, where x is very small when compared with 1.

5. Shew the method of ascertaining the height of a mountain above the level of an horizontal plane contiguous to a sloping side.

6. Prove that the minor axis of an ellipse is a mean proportional between the major axis, and the latus rectum.

7. In a right angled spherical triangle, sine of hypoth. : rad. : : sine of a side : sine of the angle opposite that side. Required a demonstration.

8. Given the two apparent weights in each end of a pair of false scales, find the true weight: and shew whether it is greater or less than $\frac{1}{2}$ their sum.

9. Find the height to which a body will rise, if projected perpendicularly from the horizon, with a velocity of 144 feet in 1″ : and find how far it will ascend in 2″.

10. Compare the time of an oscillation in a cycloid, with the time in which a body would fall through a space = length of the pendulum.

11. A cubical vessel, whose altitude is 32 inches, stands upon an horizontal plane and is filled with water: — find where a small orifice must be made in a side, that the fluid may spout to a distance equal to the height of the vessel.

12. Find the height of an homogeneous atmosphere: and shew that it is about $5\frac{1}{2}$ miles.

13. Find the principal focus of rays refracted through a sphere, denser than the ambient medium: and, supposing the focus to be in the surface of emergence, determine the ratio between the sines of incidence and refraction.

14. Determine the place of a double convex lens, between the eye of a spectator and an object at a given distance, that the apparent magnitude may be a maximum.

15. Construct two angles *geometrically*, whose sines are in the ratio a : b, and tangents in the ratio m : 1; and prove that rad. : cos. of greater ang. : : $\sqrt{\overline{m^2-1}\cdot b^2} : \sqrt{a^2-b^2}$.

16. Prove that $\dot{z} = \frac{r^2 \dot{s}}{s\sqrt{s^2-r^2}}$, where r and s are rad. and secant of the arc. z.

17. Find the fluent of $\frac{z^{\frac{1}{2}n-1}\dot{z}}{\sqrt{a^n+z^n}}$; and of $v^2\dot{x}$ where v = hyp. log. x.

18. Sum the series $\frac{1}{1.3}+\frac{1}{2.4}+\frac{1}{3.5}+$, &c. ad infinitum. And $1^2+2^2+3^2+$, &c. ... to n terms.

19. Construct an horizontal dial for a given latitude; and find the angle between the hour lines of 12 and 3.

20. Given the sun's declination and lat. of the place; find the time of its rising.

21. Shew that every equation, whose roots are possible, has as many changes of the signs as it has positive roots.

22. Prove that the periodic times in all ellipses round the same center are equal: and, round different centers, that they $\propto \frac{1}{\sqrt{\text{abs. force}}}$

23. Investigate the ratio of the angular velocities of the distance and perpendicular upon the tangent, in any curve: and apply it to the log. spiral.

24. A body descends from a given altitude by a force which $\propto \frac{1}{\overline{\text{dist.}}|^2}$, and, at the middle point of its descent, is projected with the velocity acquired, in a direction making an acute angle with the distance from the center: —what orbit will the body describe? and what will be its periodic time, when compared with the periodic time in a circle whose rad. is the given alt.?

Evening Problems.—Mr. Hornbuckle.

1. Investigate the rule for extracting the cube root, and apply it to find the cube root of 738,763264.

2. Required the discount on a given sum (£p) due $1\frac{1}{2}$ years hence, at 5 per cent. per ann.

3. Resolve the recurring series $a+bx+cx^2+dx^3+$ &c. whose scale of relation is $f+g$, into two geometrical series.

4. Two equal weights are suspended by a string passing over three tacks, which form an isosceles triangle, the base being parallel to the horizon, and the vertical angle 120°. Compare the respective pressures on the tacks with each other, and with the weights.

5. Suppose a strait rod to be partly immersed in a vessel of water; determine the angle at which it must be inclined to the surface, that the apparent bending at the surface may be a maximum.

6. A cylinder full of water, whose length is equal to the diameter of the base, is supported with its sides parallel to the horizon: compare the time of discharging half the fluid through a small orifice in the lower side in this situation, with that of discharging the same quantity through an equal orifice in the base, when the sides are perpendicular to the horizon.

7. Apply Napier's rule to find the declination of a star, which, in a given latitude, rises in the north east point.

8. Investigate the nature of the curve in which a body descends from one given point to another in the least time possible; the velocity at each point

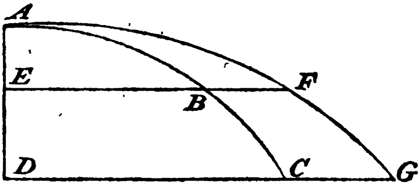
being supposed to vary as the corresponding ordinate of the curve.

9. A cylindrical rod suspended at one end, whose weight is *(W)* and length *(l)* inches, oscillates seconds; on what part of the rod must a given weight *(w)* be suspended that it may oscillate twice in a second.

10. Approximate to the roots of the equation $x^2+xy=5$, $2xy-y^2=2$, and shew on what the accuracy of an approximation depends.

11. Find the area of the curve, whose equation is $y=a\times\text{hyp. log.}\ \dfrac{a-\sqrt{a^2-x^2}}{a+\sqrt{a^2-x^2}}$ contained between the values *(a)* and *(b)* of the abscissa; x being the abscissa and y the ordinate.

12. *ABC* is a semi-cycloid, *DC* its base, *AD* its axis, *AFG* a curve traced out by assuming the ordinate *EF* always equal to the cycloidal arc *AB*: investigate the equation to the curve *AFG*, and compare its area with the area of the cycloid.



13. Sum the following series $1.3^2+3.5^2+5.7^2+$ &c. to n terms

$$\frac{1}{1.2}-\frac{1}{2.4}+\frac{1}{3.6}-\frac{1}{4.8}+\text{ \&c. ad inf.}$$

$$\frac{1}{1.2.4}-\frac{1}{2.3.5}+\frac{1}{3.4.6}-\text{ \&c. ad inf.}$$

14. The roots of the equation $x^n - px^{n-1} + qx^{n-2} - \&c. = 0$ are in arithmetical progression; the least root is $\frac{p}{n} - \frac{n-1}{n} \cdot \sqrt{\frac{\overline{n-1}\,.\,3p^2 - 6nq}{n^2-1}}$, and the common difference $\frac{2}{n} \cdot \sqrt{\frac{\overline{n-1}\,.\,3p^2 - 6nq}{n^2-1}}$. The investigation is required.

15. Find the fluents of the following quantities

$$\frac{\dot{x}}{x^3 \times \overline{a+x}|^2} \cdot \frac{b\dot{y}}{\overline{1-y}|^2 \,.\, \sqrt{1+y^2}} \cdot \frac{a\dot{x}}{x\sqrt{a^2 - ax + x^2}}$$

16. Prove that when the first point of Aries rises, the ecliptic makes the least angle with the horizon, and when it sets, the greatest; and thence explain the phænomenon of the harvest moon.

17. Suppose a body describing a logarithmic spiral in a resisting medium, the density varying inversely as the distance, and the centripetal force as the square of the density, to be deprived of its angular motion at a given distance from the center: compare the time of its descent to the center in a strait line, with the time of descent in the spiral.

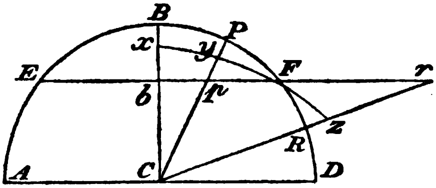
18. Two bodies, whose weights are *A* and *B*, are projected together with the respective velocities, *a* and *b*, from the same point, in the same direction, and at a given angle of inclination to the horizon. Required the greatest altitude to which their common center of gravity will ascend, and the path described by it.

19. A cylindrical vessel, of given altitude and base, is situated on a horizontal plane; an eye is placed so as to see only the farther extremity of that diameter of the base which passes through the point,

in which a perpendicular drawn from the eye to the plane meets it: To what depth must it be filled with water, that the eye in the same situation may see the center of the base?

20. Construct a vertical south-east dial.

21. ABD is a semi-circle, AD its diameter, EF any chord parallel to AD, produced indefinitely, CB, CP, CR radii; the parts Bb, Pp, Rr of the radii, intercepted between the chord, or the chord produced, and the circumference, are bisected in x, y, z: find the nature of the curve passing through all the points of bisection, both within, and without the circle.



22. Investigate the number expressing the probability of throwing an ace at least (t) times in (n) trials with a die of (p) faces marked 1, 2, 3 . . . p.

23. Shew that Newton has properly applied the principles of the golden rule in his investigation of the ratio between the equatorial and polar diameters of the earth; i. e. if this ratio be that of $1+n : 1$, n being very small, and the figure of the earth an oblate spheroid, prove that the excess of weight supported at the equator is proportional to the difference (n) of the diameters.

24. Find at what angle a plane, which is perpendicular to the plane of the meridian, must be

inclined to the horizon of a given place, that the diurnal path of the shadow of the extremity of an object, erected perpendicular to the horizon, may be a parabola on the plane: the sun's declination being given, and supposed invariable during the course of one day.

1802.

Morning Problems.—Mr. Palmer.

FIRST AND SECOND CLASSES.

1. Given the three angles of a plane triangle, and the radius of its inscribed circle, to determine its sides.

2. The specific gravities of two fluids, which will not mix, are to each other as $n : 1$, compare the quantities which must be poured into a cylindrical tube, whose length is a *(a)* inches, that the pressures on the concave surfaces of the tube, which are in contact with the fluids, may be equal.

3. Determine that point in the arc of a quadrant from which two lines being drawn, one to the center and the other bisecting the radius, the included angle shall be the greatest possible.

4. Required the linear aperture of a concave spherical reflector of glass, that the brightness of the sun's image may be the same when viewed in the reflector and in a given glass lens of the same radius.

5. Determine the evolute to the logarithmic spiral.

6. Prove that the periodic times in all ellipses about the same center are equal.

7. The distance of a small rectilinear object from the eye being given, compare its apparent magnitude when viewed through a cylindrical body of water with that perceived by the naked eye.

8. Find the fluents of the quantities $\frac{d\dot{x}}{x.\overline{a^2-x^2}}$, and $\frac{h\dot{y}}{y.\overline{a+y}|^{\frac{3}{2}}}$

9. Through what space must a body fall internally, towards the center of an ellipse, to acquire the velocity in the curve?

10. Find the principal focus of a globule of water placed in air.

11. Determine, after Newton's manner, the law of the force acting perpendicular to the base, by which a body may describe a common cycloid.

12. Find the area of the curve whose equation is $xy = a^x$.

13. What is the value of the quantity q so that force $\times \overline{\text{period}}|^2 = q \times$ radius of circle.

14. Two places, A and B, are so situated that when the sun is in the northern tropic it rises an hour sooner at A than at B; and when the sun is in the southern tropic it rises an hour later at A than at B. Required the latitudes of the places.

15. From what point in the periphery of an ellipse may an elastic body be so projected as to return to the same point, after three successive reflections at the curve, having in its course described a parallelogram.

MISCELLANEOUS QUESTIONS.

Trisect a right angle.

Find the diameter and diagonal of a cube whose side = 7.

Similar triangles are to each other in the duplicate ratio of their homologous sides.—Prove it.

Prove the truth of the Arithmetical rules for the addition, subtraction, multiplication, and division of fractions.

Investigate the rule for the extraction of the square root.

Which is greatest, the ratio $\sqrt[3]{3} : \sqrt{2}$, or $\sqrt{3} : \sqrt[3]{5}$

Shew that the magnitude of an object to the eye varies inversely as the distance.

Find (*n*) arithmetic, and (*p*) geometric means between (*a*) and (*b*.)

Shew the method of measuring the circumference of the earth, and how to draw a meridian line.

Let a solid whose specific gravity $=4$, float in a fluid whose specific gravity $=10$. Required the proportion between the parts immersed and extant.

Divide $x^{\frac{3}{4}}$, by $x^{\frac{1}{2}}-a^{\frac{1}{2}}$ and r^n by $a^{\frac{m}{n}}-r^{\frac{m}{n}}$, to five terms in the series.

Divide ,48624097 by 179; and 14 by ,7854.

Required the value of ,583 of a pound.

Quere the reason for pointing every 2d figure in extracting the square root, and every 3d in the cube root.

Assign the physical cause of the blue appearance of the sky on a clear day, and its western redness at sun-set.

Why are natural days unequal?

From whence does it appear that the systems of Ptolemy and Tycho are false?

Given the periodic times of the seven primary planets, to find the time between their all being in conjunction together.

Demonstrate that every angle $\propto \frac{\text{Arc.}}{\text{Radius.}}$

Prove, that in any lever, $P : W$ :: perpendicular from the center of motion, to the direction in which the weight acts : do. in which the power acts; and that when P and W act parallel, the lever will rest in any position, except the center of gravity be below the point of suspension.

Clear the equation $x^3 - \frac{px^2}{m} + \frac{qx}{n} - r = o$ of fractions.

In how many years would (a) pounds amount to (p) pounds at (r) rate of compound interest.

Find the sum of the circulating decimal ,99999.

Find the fluent of $\frac{\dot{t}}{1-t^2}$

Given the altitude of the mercury in the barometer at the top and bottom of a mountain, to find its height.

Shew, that in a plane reflector, a man will see his whole length, if the reflector be $= \frac{1}{2}$ his length.

Find the focus of the reflected rays of a concave surface.

Find the sum of the series $1 - \frac{1}{2} + \frac{1}{4} - \frac{1}{8} +$ &c.; and ten terms of the series $3 + 7 + 11$ &c.

Shew that a ray of light issuing from a point and reflected to the eye describes the shortest path possible, when the angle of incidence = the angle of reflection.

Let a body be supported upon an inclined plane, first, by a power parallel to the length, then by a power parallel to the base. Compare the pressure.

A body rests upon a string between two pullies in an horizontal position, being balanced by two equal bodies, hanging on opposite sides. Find the distance of the body from the horizontal line.

Prove the Binomial Theorem, by the method of increments.

Extract the 4th root of $16a^4 - 96a^3b + 216a^2b^2 - 216ab^3 + 81b^4$.

Reduce the fraction $\frac{1}{a^{\frac{11}{4}}}$ to one whose denominator shall be a^3.

Investigate the rule for extracting the square root of any binomial surd.

Investigate the general expressions for summing an arithmetic and geometric series.

Find the value of x in the following equations:

$\frac{1}{2}x - \frac{1}{3}\sqrt{x} = 22\frac{1}{6}$; $ax^n - bx^{\frac{n}{2}} - c = -d$; $2x^4 - x^2 + 104 = 600$.

Prove that the spaces described by a body in successive times are in arithmetic progression.

Find the value of x in the following simple equations:

$x + \sqrt{a^2 + x^2} = \frac{2a^2}{\sqrt{a^2 + x^2}}$; $\sqrt[3]{x^3 - a^3} = x - a$; $\sqrt{a^2 + x^2} = \sqrt[4]{b^4 + x^4}$; and $x = \sqrt{a^2 + x \times \sqrt{b^2 + x^2} - a}$.

Explain the construction of Briggs's Tables of Logarithms.

Shew that the time of an oscillation of a body in a cycloid, is to the time of a body in the chords of a circle whose radius is equal the length of the pendulum :: circumference of a circle : 4 times its diameter.

Given a beam, and the weight that will break it, to find the length of a similar beam, which being similarly situated, will break by its own weight.

Find the area and length of the common parabola.

Find the fluxion of x^x.

Extract the cube root of $7+5\sqrt{2}$ nearly, and investigate the rule.

Find the fluent of $\overline{a+cz^n}|^m \times dz^{3n-1}\dot{z}$.

Afternoon Problems.—Mr. Dealtry.

THIRD AND FOURTH CLASSES.

1. Inscribe the greatest cylinder in a given sphere.

2. Rays, which pass through a globe at equal distances from the center, are turned equally out of their course.—Required a proof.

3. Given the declination of the sun and the latitude of the place, to find the duration of twilight.

4. A cylindrical vessel, 16 feet high, empties itself in four hours by a hole in the bottom.—What space does the surface describe in each hour?

5. Prove that if two circles touch each other externally, and parallel diameters be drawn, the straight lines, which join the opposite extremities of these diameters, will pass through the point of contact.

6. A ball, whose elasticity : perfect elasticity :: n : 1, falls from a given height upon a hard plane, and rebounds continually till its whole motion is lost. —Find the space passed over.

7. If a body revolves in any curve, compare the angular velocity of the perpendicular with that of the distance.

8. How far must a body fall externally to acquire the velocity in a circle, the force varying as the distance.

9. Given the right ascensions and declinations of two stars, to find their distance.

10. Find the velocity, with which air rushes into an exhausted receiver.

11. Let the roots of the equation $x^3 - px^2 + qx - r = 0$ be a, b and c, to transform it into another, whose roots are a^2, b^2, c^2.

12. Find the fl. $\frac{z\dot{z}}{1+2az+z^2}$ where a is less than 1; and of $\frac{x\dot{x}}{\sqrt{a^2+x^2}}$.

13. Find that point in the ellipse, where the velocity is a geometric mean between the greatest and least velocities, the force varying $\frac{1}{D^2}$.

14. Determine the position of a line drawn from a given point to a given inclined plane, through which the body will fall in the same time as through the given plane.

15. The equation $x^3 - 5x^2 + 8x - 4 = 0$ has two equal roots.—Find them.

16. Find the sum of the cube numbers $1+8+27+$ &c. by the differential method; and sum the following series by the method of increments:

$1.2 + 2.3 + 3.4 +$ &c. n terms.

$\frac{1}{1.2} + \frac{1}{2.3} + \frac{1}{3.4}$ &c. n terms and ad infinitum.

17. If half of the earth were taken off by the impulse of a comet, what change would be produced in the moon's orbit?

18. Prove that if the eye be placed in the principal focus of a lens, the image of a given object would always appear the same.

19. Find the time of emptying a given paraboloid by a hole made in the vertex.

20. Find the proportion between the centripetal and centrifugal forces in a curve; and apply the expression to the reciprocal spiral.

Afternoon Problems.—Mr. Dealtry.

FIFTH AND SIXTH CLASSES.

1. Prove that an arithmetic mean is greater than a geometric.

2. Every section of a sphere is a circle.—Required a proof.

3. If $\frac{3}{4}$ of an ell of Holland cost $\frac{1}{4}$£. what will $12\frac{2}{3}$ ells cost?

4. Prove the method of compleating the square in a quadratic equation.

5. Take away the second term of the equation $x^2-12x+5=0$.

6. Inscribe the greatest rectangle in a given circle.

7. Sum the following series:

$$1+3+5+7+\text{ \&c. to } n \text{ terms.}$$

$$3-1+\frac{1}{3}-\frac{1}{9}+\text{ \&c. ad inf.}$$

$$\frac{1}{1.2.3}+\frac{1}{2.3.4}+\frac{1}{3.4.5}\text{ \&c. ad inf.}$$

8. Find the value of x in the following equations:

$$\frac{42x}{x-2}=\frac{35x}{x-3}$$

$$\frac{x+1}{2}+\frac{x+2}{3}=16-\frac{x+3}{4}.$$

$$3x^2-14x+15=0.$$

9. In a given circle to inscribe an equilateral triangle.

10. Two equal bodies move at the same instant from the same extremity of the diameter of a circle with equal velocities in opposite semi-circles. Required the path described by the center of gravity; find the path also when the bodies are unequal.

11. Through what chord of a circle must a body fall to acquire half the velocity gained by falling through the diameter.

12. Given the latitude of the place and the sun's meridian altitude, to find the declination.

13. Given the sun's altitude and azimuth and the latitude of the place, to find the declination and the hour of the day.

14. Prove that the vel. in a parabola : vel. in a circle at the same distance : : $\sqrt{2} : 1$.

15. How far must a body fall internally to acquire the vel. in a circle, the force varying $\frac{1}{D^2}$?

Evening Problems.—Mr. Dealtry.

FIRST, SECOND, THIRD, AND FOURTH CLASSES.

1. Find four geometric means between 1 and 32, and three arithmetic means between 1 and 11.

2. Suppose a straight lever has some weight, and at one end a weight is suspended equal to that of the lever; where must the fulcrum be placed, that there may be an equilibrium?

3. Determine the latitude of the place, where the sun's meridian altitude is 73°. 24′. 13″. its declination south being 16°. 36′. 47″.

4. If Q represent the length of a quadrant, whose radius is R, and the force vary $\frac{1}{D^2}$, the time of descent half way to the center of force : the time through the remaining half :: $Q+R$ :: $Q-R$. Required a proof.

5. P and W represent two weights hung over a fixt pulley; supposing P to descend, what space will it describe in t'', the inertia of the pulley being taken into the account?

6. If a pendulum, whose length is 40 inches would oscillate in 1″ at the pole of a sphere, the radius of which is 4000 miles; what must be the time of rotation round its axis, that the same pendulum at the equator may oscillate twice in 3″?

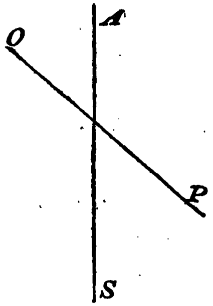
7. A given cone is immersed in water with its vertex downward; what part of the axis will be immersed, if the specific gravity of the fluid : that of the cone :: 8 : 1?

8. The axis of a wheel and axle is placed in a horizontal position, and a weight y, which is applied to the circumference of the axle is raised by the application of a given moving force p applied to the circumference of the wheel; given the radii of the wheel and axle, it is required to assign the quantity y, when the moment generated in it in a given time is a maximum, the inertia of the wheel and axle not being considered.

9. Would Venus ever appear retrograde according to the Tychonic system?

10. A perfectly elastic ball begins to fall from a given distance SA in a right line towards the center

of force *S*, the force varying $\frac{1}{D^2}$; in its descent, it impinges upon a hard plane *OP* inclined to *SA* at a given angle, and after describing a certain curve comes to the plane on the other side, and is then reflected to the center; find the nature of this curve; and determine the whole time of descent to the center *S* in terms of the periodic time of a body revolving in a circle at the distance *SA*.



11. Let parallel rays be refracted through two contiguous double convex lenses; find the focal length on the supposition that the radii of all the surfaces are equal, and the sine of incidence : sine of refraction :: 5 : 4.

12. Given the latitude of the place and the declination of the sun, the former being less than the latter; to find at what time of the day the shadow of a stick would be stationary, and how far it would afterwards recede on the horizontal plane.

13. Transform the equation $x^n - px^{n-1} + qx^{n-2} -$ &c. $= 0$ into one, whose roots are the reciprocals of the sum of every $n-1$ roots of the original equation.

14. A body descends down the cycloidal arc *AM*, the base *AL* being parallel to the horizon and *M* the

lowest point of the cycloid; determine that point where its velocity in a direction perpendicular to the horizon is a maximum.

15. Construct the equation $a^2y^2-x^2y-a^3=0$.

16. Compare the time of descent to the center in the logarithmic spiral with the periodic time in a circle, whose radius is equal to the distance from which the body is projected downward.

17. Given the difference of altitudes of two stars, which are upon the meridian at the same time, and their difference of altitudes and difference of azimuths an hour afterwards, to find the latitude of the place.

18. A person's face in a reflecting concave decreases to the principal focus, and then increases in going from it.—Required a demonstration.

19. Prove that the mean quantity of the disturbing force of S upon P, in the 66th proposition of Newton, during one revolution of P round T, is ablatitious, and equal to half the mean addititious force.

20. The time of the sun's rising is the time which elapses between the appulse of the upper and under limb of the sun's disc to the horizon; given the sun's apparent diameter and the latitude of the place, it is required to determine the declination, when this time is a minimum.

21. Through a given point situate between two right lines given in position, to draw a third line cutting them in such a manner, that the rectangle under the parts intercepted between the point and the two lines may be a minimum.

22. Let a spherical body descend in a fluid from rest; having given the diameter of the sphere, and its specific gravity with reference to that of the fluid,

it is required to assign the velocity of the sphere at any given point of the space described.

23. The distance of the center of gravity from the vertex of a solid formed by the revolution of a curved surface is $\frac{2}{3}$ of its axis.—Determine the nature of the generating curve.

24. Suppose a given cylindrical vessel filled with water to revolve with a given angular velocity round its axis.—Required the quantity contained in the cylinder, when the water and cylinder are relatively at rest.

25. Sum the following series:

$$\frac{10}{1.2.3.4}+\frac{14}{2.3.4.5}+\frac{18}{3.4.5.6}+\text{\&c. to } n \text{ terms and}$$

ad inf.

$$\frac{5}{1.2.3}\times\frac{1}{2^2}+\frac{6}{2.3.4}\times\frac{1}{2^3}+\frac{7}{3.4.5}\times\frac{1}{2^4}+\text{\&c. ad inf.}$$

$$\frac{1}{1.3}-\frac{1}{3.5}+\frac{1}{5.7}-\text{\&c. ad inf.}$$

26. Given the fl. $\overline{a+cz.^{n}}\big|^{m}\times z^{pn+n-1}\dot{z}$ to find the fl. $\overline{a+cz^{n}}\big|^{m+1}\times z^{pn-1}\dot{z}$;

Required also fl. $\frac{\dot{x}\sqrt{a^2+x^2}}{x^3}$; and of $\frac{z^{\theta}\dot{z}}{1+mz}$, θ being a whole positive number.

Morning Problems.—Mr. Dealtry.

FIRST AND SECOND CLASSES.

1. Inscribe the greatest cone in a given spheroid.

2. A parabolic surface is immersed vertically in a fluid, whose density increases as the depth, with

its base contiguous to the surface of the fluid; find upon which of the ordinates to the axis there is the greatest pressure.

3. Solve the equation $x^3 - px^2 + qx - r = 0$, whose roots are in geometric progression.

4. Suppose the reflecting curve to be a circular arc, and the focus of incident rays in the circumference of the circle, to find the nature of the caustic.

5. If the sine of incidence : sine of refraction :: $m : n$, required the focal length of a hemisphere, the rays falling first on the convex side.

6. If the subtangent of a logarithmic curve be equal to the subtangent of the reciprocal spiral, prove that the arc intercepted between any two rays in the spiral is equal to the arc intercepted between any two ordinates of the curve respectively equal to the former.

7. In what direction must a body be projected from the top of a given tower with a given velocity, so that it may fall upon the horizontal plane at the greatest distance possible from the bottom of the tower?

8. Draw an asymptote to the elliptic spiral.

9. If water or any fluid ascends and descends with a reciprocal motion in the legs of a cylindrical canal inclined at any angle, to find the length of a pendulum which will vibrate in the same time with the fluid.

10. Find the fl. $vx\dot{x}$, where $v = H.L.\overline{x + \sqrt{x^2 + a^2}}$

11. The centrif. force at the equator arising from the rotation of the earth round its axis : the centrifugal force in any parallel of latitude :: $\overline{\text{rad.}}|^2 : \overline{\text{sine}}|^2$ of the co. lat.—Required a proof.

12. Given the latitudes of two places together with their difference of longitudes, to find the declination of the sun, when it sets to the two places at the same time.

13. Required the equation to a curve, whose subtangent is equal to n times its abscissa.

14. If the force vary $\frac{1}{D^{n+1}}$, how far must a body fall externally to acquire the velocity in any curve, whose chord of curvature at the point of projection is c; and apply the expression to the parabola and logarithmic spiral.

Afternoon Problems.—Mr. Palmer.

THIRD AND FOURTH CLASSES.

1. Find the value of £.123333 &c.

2. Determine geometrically a mean proportional between the sum and difference of two given straight lines.

3. What is the general form of parallelograms, whose diameters cut each other at right angles?

4. Investigate the area of a circle, whose diameter is unity: and prove that the areas of different circles are in a duplicate ratio of their diameters.

5. Divide a given line into two parts, such that their product multiplied by their difference may be a maximum.

6. Prove that in any curve the velocity : velocity in a circle at the same distance (SP) :: $\sqrt{\text{chord of curvature}} : \sqrt{2SP}$.

7. A body projected from one extremity of the diameter of a circle, at an angle of 45°, strikes a

mark placed in the center. Required the velocity of projection and greatest altitude.

8. Find the area of a curve whose equation is $y=\frac{a^3}{a^2-x^2}$.

9. In how many years will the interest due upon £100. be equal to the principal, allowing compound interest?

10. Admitting the periods of the different planets to be in a sesquiplicate ratio of the principal axes of their orbits, shew that they are attracted towards the sun by forces reciprocally proportional to the squares of their several distances from it.

11. Prove that in the course of the year the sun is as long above the horizon of any place as he is below it.

12. Determine the limits within which an eclipse of the sun or moon may be expected: and shew what is the greatest number of both which can happen in one year.

13. Prove that the time in which any regular vessel will freely empty itself : time in which a body will freely fall down twice its height : : area of base : area of orifice.

14. Find the fluents of $\frac{x\dot{x}}{\sqrt{a-x}}$; $\frac{x^2\dot{x}}{a-x}$.

15. Find the principal focus of a lens; and shew how an object may be placed before a double convex lens, that its image may be inverted and magnified so as to be twice as great as the object.

16. Prove that Cardan's rule fails unless two roots of the proposed cubic be impossible; and determine

whether that rule be applicable to the equation $x^3-237x-884=0$.

17. Deduce Newton's general expression in sect. 9. for the force in the moveable orbit.

18. Define logarithms, and explain their use: also, prove that log. $A \times B =$ log $A +$ log. B.

19. Explain the different kinds of parallax; and shew from the want of parallax in the fixed stars, that their distance from the earth bears no finite ratio to that of the sun.

Afternoon Problems.—Mr. Palmer.

FIFTH AND SIXTH CLASSES.

1. How many yards of cloth, worth 3s. 7½d. per yard, must be given in exchange for 935½ yards, worth 18s. 1½d. per yard?

2. Find the interest of £873. 15s. 0d. for 2½ years, at 4¾. per cent.

3. Prove that the diameters of a square bisect each other at right angles.

4. Prove the opposite angles of a quadrilateral figure inscribed in a circle equal to two right angles.

5. Prove that if $A \propto B$ when C is given, and $A \propto C$ when B is given, when neither B nor C is given, $A \propto BC$.

6. Prove radius a mean proportional between tangent and cotangent; and that sine × cosine $\propto$ $\overline{\text{sine}}|^2$ of twice the angle.

7. Given the sine of an angle, to find the sine of twice that angle.

8. Prove that in the parabola $\overline{\text{ordinate}}|^2 =$ abscissa × parameter.

9. Extract the square root of $a^3 - x^3$.

10. Solve the equation $3x^2 - 19x + 16 = 0$.

11. Prove that motion when estimated in a given direction is not increased by resolution.

12. Find the ratio of $P : W$ when every string in a system of pullies is fastened to the weight.

13. Prove that time of oscillation $\propto \frac{\sqrt{\text{length}}}{\sqrt{\text{force}}}$.

14. Prove that when a fluid passes through pipes kept constantly full, velocity $\propto \frac{1}{\text{area of section}}$.

15. Define the center of a lens; and find the center of a meniscus.

16. Find the fluxion of $\sqrt{a^3 + x^3 - \sqrt{a^2 - x^2}}$.

17. Prove elevation of the æquator above the horizon = co. latitude.

18. Prove that sagita $\propto \overline{\text{arc}}|^2$.

19. Prove that in the same orbit velocity $\propto \frac{1}{\text{perp}}$.

Evening Problems.—Mr. Palmer.

FIRST, SECOND, THIRD, AND FOURTH CLASSES.

1. When £100. stock may be purchased in the 3 per cents. for £59½. at what rate may the same quantity of stock be purchased in the 5 per cents. with equal advantage?

2. A ball of wood being balanced in air by the same weight of iron, how will the æquilibrium be affected when the bodies are weighed in vacuo? and by what weight of wood, properly disposed, may the equilibrium be restored?

3. Investigate the value of the circumference of a circle whose radius is unity.

4. Compare the areas of the parabolas described by two bodies projected together from the same point, and with the same velocity, towards a mark situated in an horizontal plane, the angles of elevation being to each other : : 2 : 1.

5. Prove the rule for finding the quadratic divisors of any equation; and apply it to the equation $x^4 - 17x^3 + 88x^2 - 172x + 112 = 0$.

6. On what point of the compass does the sun rise to those who live under the æquinoctial, when he is in the northern tropic?

7. How many equal circles may be placed around another circle of the same diameter, touching each other and the interior circle?

8. Determine the resistance of the medium in which a body by an uniform gravity may describe a parabolic orbit?

9. Prove that a body moving in the reciprocal spiral, approaches or leaves the center uniformly.

10. Find the velocity and time of flight of a body projected from one extremity of the base of an equilateral triangle, and in the direction of the side adjacent to that extremity towards an object placed in the other extremity of the base.

11. Define similar curves; and prove that conterminous arcs of such curves have their chords of curvature at the point of contact in a given ratio.

12. Compare the time of a revolution about the center of a given ellipse, with that about its focus.

13. Find the attraction of a corpuscle placed in the axis of a cylindrical superficies, whose particles attract in an inverse duplicate ratio of the distance.

14. Prove that if the center of oscillation of a pendulum be made the point of suspension, the former point of suspension becomes the center of oscillation.

15. Determine the content of the solid generated by a semicircle revolving about a tangent parallel to it's base.

16. Find the fluents of

$$\frac{\overline{x}^{-2}\,\dot{x}}{\sqrt{a-x}};\quad y^{\frac{3n-1}{2}}\,\dot{y}\sqrt{\overline{a^n-y^n}};\quad \frac{v\dot{v}}{\overline{a+v}\,.\,\overline{a^2+v^2}}.$$

17. Sum the series $1-\frac{1}{2^3}+\frac{1}{2^5}-\frac{1}{2^7}+$ &c. ad inf. and also to n terms.

$\frac{1}{1.5}+\frac{1}{2.6}+\frac{1}{3.7}+$ &c. to n terms. $\frac{1}{1.3}+\frac{1}{3.7}+\frac{1}{5.11}$ $+$ &c. ad inf.

18. Required the sun's place in the ecliptic, when the increment of his declination is equal to that of his right ascension.

19. Prove that the force by which a body may describe a curve, whose ordinates are parallel, is proportioned to $\pm\ddot{y}$: and determine the quantity q such that force $=q\times\pm\ddot{y}$.

20. Compare the times in which a cylinder, whose axis is parallel to the horizon, will discharge the first and last half of its content through an orifice in its lowest section.

21. Prove that the image of a straight line immersed in water appears concave to an eye placed any where between the extremities of the line.

22. At what distance from the earth would the apparent brightness of the moon be equal to that of Saturn and his ring together, supposing the apparent brightness of Saturn to that of his ring : : 2 : 1?

1803.

Morning Problems.—Mr. Hornbuckle.

FIRST AND SECOND CLASSES.

1. Find six geometric means between the numbers *a* and *b*.

2. Half the breadth of any very thin glass lens is a mean proportional between its thickness and focal length nearly. The demonstration is required.

3. Find the integral of $\frac{x}{4}$, $\dot{x}$ being unity.

4. Sum the series $\frac{1}{1^2}+\frac{1}{3^2}+\frac{1}{5^2}+$&c. from the series expressing the cosine of a given arc in terms of the arc.

5. In what part of the moon's orbit is her gravity towards the earth unaffected by the action of the sun?

6. A globe of given weight is supported between two planes inclined to the horizon at the respective angles of 60° and 30°. Compare the weights sustained by the planes with each other and with the whole weight.

7. Shew that a particle in the vertex of a triangle, from which a perpendicular falls on the base, is attracted towards the segments of the base with forces which are to each other inversely as the secants of the angles at the base: the law of attraction being the inverse square of the distance.

8. Two stars, whose right ascensions and declinations are given, are on the same azimuth, and the altitude of one of them is known; the latitude of the place is required.

9. Determine geometrically those points in an ellipse in which the centripetal and centrifugal forces are equal, the center of force being in the center of the ellipse.

10. Find the time of vibration of a cylindrical rod of given length suspended at one end, the density of which varies as the distance from the point of suspension.

11. Into how many parts must a given quantity, 2, be divided, that their continued product may be a maximum?

12. The altitude of the mercury in the gauge of a receiver is a inches, the standard altitude being h inches, after n turns: compare the capacities of the receiver and the barrel.

13. A ring of given weight descends by its gravity down the arc of a given quadrant which revolves uniformly about its axis perpendicular to the horizon in t''. Find the velocity of the ring at any point of its descent.

Afternoon Problems.—Mr. Woodhouse.

THIRD AND FOURTH CLASSES.

1. Of right-angled triangles having the same base, determine that, down whose hypothenuse, a body descends in least time.

2. Compare the angular velocities of SP and Sy, when a body moves in an ellipse, force in focus.

3. What is the space through which a sphere sinks in water: the specific gravity of sphere being $\frac{1}{4}$ of specific gravity of water?

4. From what arguments is it inferred that the earth's form is not spherical?

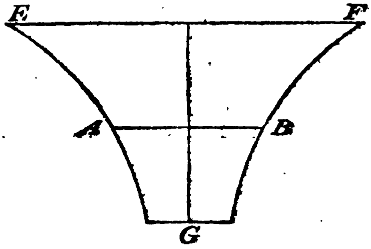
5. Required length of pendulum vibrating 180 times in a minute.

6. A and B hang over a pully, and $A=2B$: through what space will a body descend by the action of gravity, whilst A descends two feet?

7. To what height would a body moving in an ellipse round the center ascend, if projected upwards in the direction of a line from the center, with the velocity with which it revolves?

8. Explain the construction of the common pump.

9. What must be the form of the vessel EFG, so that the pressure on every horizontal section, as AB, shall be the same?



10. If parallel rays pass through a prism whose refracting angle is small, and the angle of incidence be also small, shew that the deviation is proportional to the refracting angle.

11. Find the expression for the force of the body in the moveable orbit, supposing the immoveable orbit to be an ellipse with force in center.

12. The focal length of a sphere is n times the radius of the sphere. Required proportion of sines of incidence and refraction.

13. Draw a line to touch two given circles.

14. Find the area of an equilateral and equiangular octagon.

15. If a globe in its quantity of matter = a cylinder that could exactly circumscribe it, what is the proportion between the densities of the globe and cylinder?

16. Given the height (h) and radius (r) of a section of the outer surface of a cylindrical shell, to find the thickness of the shell, when its quantity of matter = quantity of matter in sphere (rad. r), (densities the same): shew also, than what line, h must necessarily be greater.

17. Give the definition of the fluxion of a quantity, and, from such definition, find the fluxion of $x^{\frac{m}{n}}$.

18. Find area of curve, the ordinate (y) of which $= ax + \frac{b}{\sqrt{1-x^2}}$.

19. Sum n terms of $1 + \frac{1}{4} + \frac{1}{16} + \frac{1}{64}$, &c.

20. Shew how the logarithm of 101 may be found.

21. Which is greater, $x^3 + y^3$, or $x^2y + y^2x$, $x \urcorner y$?

22. If from any point within an equilateral triangle, perpendiculars be drawn to the three sides, their sum equals a perpendicular drawn from one of the angles on the opposite side. Required proof.

Evening Problems.—Mr. Woodhouse.

1. Two weights, $A=5$, $B=3$, hang over a pully: What must be the length of a pendulum that makes one oscillation, whilst A descends one foot?

2. In a cylinder filled with water to the height (h), place a sphere, whose specific gravity$=\frac{1}{3}$ of the specific gravity of water; and whose diameter very nearly equals that of the cylinder: What will be the ascent of the water?

3. Given the horizontal refraction (h), find how much the rising of the sun is accelerated by it.

4. Let three points with velocities, V, V', V'', move the same way, uniformly in the periphery of a circle. Required the time of their conjunction, supposing them to quit a given point at the same time.

5. Sun's meridian altitude on longest day$=63°. 14'$. Required latitude of place.

6. Determine the form of a surface, such, that rays issuing from a given point, may, after refraction, be made convergent to another given point.

7. Let a body be projected obliquely to the distance, with a force varying as n^{th} power of the distance: shew in what values of n the angle between the apsides will not be affected by the excentricity of the orbit.

8. A funipendulous body in an uniformly resisting medium is accelerated by a force varying as the distance from the lowest point in the curve. Required the point where the velocity is the greatest; and also, the time of one oscillation.

9. Given the apparent diameter of the sun at the mean distance, and the angular distance from apogee to find the sun's apparent diameter.

10. A body with a velocity of 80 feet per second is projected upwards, along a plane 50 feet long, and inclined to the horizon at an angle of 30°: prove that the body, after quitting the plane, describes a parabola; and find the parameter.

11. The length of the solar year being $365^d. 5^h. 48' 49''$. shew that the intercalations may be determined from a series of fractions, as $\frac{4}{1}, \frac{29}{7}, \frac{33}{8}, \frac{128}{31}, \frac{161}{39}, \frac{2704}{655}, \frac{2865}{694}, \frac{5569}{1349}, \frac{86400}{20929}$; so that, the intercalation of 1 day in 4 years is too great, of 7 days in 29 years too little, of 8 days in 33 years too great, &c. &c.

12. If, on the inner surface of a paraboloid, a body whirled round as a circular pendulum (the point of suspension being in the axis of the paraboloid) describes a circle, then the time of revolution is the same, whatever is the circle, and equal to two oscillations of a common pendulum, the length of which equals the semiparameter of the parabola. Required proof.

13. What sum ought to be given for the lease of an estate for 20 years, of the clear annual rent of £100. in order that the purchaser may make 8 per cent. of his money.

14. $\text{Sin.} nA = 2 \cos. A. \sin.(n-1) A - \sin.(n-2) A.$

$\cos. nA = 2 \cos. A \cos. (n-1) A - \cos. (n-2) A.$

Required proof.

15. a, b, c, &c. being any quantities, make $\Delta a = b - a$, $\Delta^2 a = c - 2b + a$, $\Delta^3 a = d - 3c + 3b - a$, &c. then, $a + bx + cx^2 + \&c. = \frac{a}{1-x} + \frac{\Delta a . x}{(1-x)^2} + \frac{\Delta^2 a . x^2}{(1-x)^3} + \&c.$ Required proof.

16. Find the integral equation of $ay + \frac{b\dot{y}}{\dot{x}} + \frac{c\ddot{y}}{\dot{x}^2} = 0$, a, b, c, being constant.

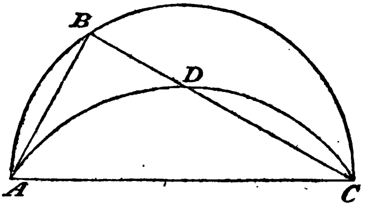
17. $(a+b)(a+b-1)(a+b-2)\ldots\ldots(a+b-n+1)$
$= a(a-1)(a-2)\ldots(a-n+1) + a(a-1)(a-2)$
$\ldots\ldots(a-n+2)\,nb$

$+ a(a-1)(a-2)\ldots(a-n+3).\frac{n.n-1}{2}\,b.(b-1)$
$+$ &c.

$+ b.(b-1)(b-2)\ldots\ldots(b-n+1)$. Required proof.

18. If a cylinder and inscribed sphere be cut by two parallel planes perpendicularly to the axis, prove that the surfaces of cylinder and of sphere included between the planes, are equal.

19. ABC is a semi-circle, ADC a quadrant: prove that the line BA always $= BD$; and that the longer only of the lines AB, CB, can cut the quadrant.



20. Let a, b, c, be the sides of any rectilinear triangle; put $S = a+b+c$; then the area is equal to the square root of this product, viz.

$$\frac{S}{2}\cdot\left(\frac{S}{2}-a\right)\left(\frac{S}{2}-b\right)\left(\frac{S}{2}-c\right).$$ Required proof.

21. Let S', S'', S''', be the respective projections of any plane surface S, on three co-ordinate planes, then $S^2 = S'^2 + S''^2 + S'''^2$. Required proof.

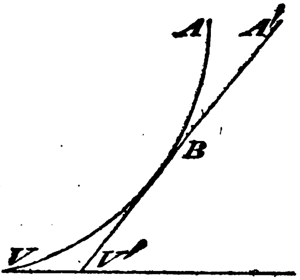
22. Shew that there can only be five regular polyhedrons.

23. Of all isoperimetrical polygons having the same number of sides, the greatest is that which is equilateral. Required proof.

Morning Problems.—Mr. Woodhouse.

FIRST AND SECOND CLASSES.

1. The straight line $A'BV'$, $=$ the semi-cycloid ABV, and touches it at the middle point B: compare the time of describing $A'BV'$ with the time of half an oscillation.



2. Let the reflecting curve be a circular arc, and let parallel rays be incident in its plane: find the cusp of the caustic, and prove the density of reflected rays to be there greater, than at any other point.

3. Two bodies from different distances fall to the center of force $\left(\text{force} \propto \frac{1}{(\text{dist.})^2}\right)$; then shew, that the times of their descent are in the sesquiplicate ratio of the whole spaces described.

4. Compare the times of emptying (on the common hypothesis) through equal orifices, two prisms of different heights and bases.

5. Prove that at the point where the $\angle SPy$ (in any curve) is a minimum, the angular velocities of

SP and Sy are equal; and determine that point in an ellipse, force in focus.

6. If a body fall down the axis of a right-angled cone, the vertex downwards and axis vertical, in what point of its descent will it have acquired velocity sufficient to describe a circle on the surface of the cone, when whirled round as a circular pendulum?

*7. The force varying as the distance, project a body from a given distance (d), at a given angle (a): investigate the orbit after the manner of the 8th section.

8. Tranform $x-\frac{x^2}{2}+\frac{x^3}{3}-$ &c. into a series as $\frac{ax}{1+x}+\frac{a'x^2}{(1+x)^2}+\frac{a''x^3}{(1+x)^3}+$ &c.

9. Find a number, of which divided by 2, 3, 5, respectively, the remainders are 1, 2, 3.

10. Determine the length of the curve, in which the rectangle of the abscissa and ordinate $=$ the rectangle of the subtangent and a given line (a).

11. Shew the method by which Archimedes approximated to the length of the circle.

12. Of all triangles having the same base and perimeter, the isosceles triangle is that of which the area is the greatest. Required proof.

13. The surface and solidity of a sphere are respectively equal to two thirds of the surface and solidity of the circumscribing cylinder, the areas of the bases of the cylinder forming part of its surface. Required demonstration.

14. Prove that the surface of a sphere can be completely covered with the surfaces either of 4, or of 8, or of 20 equilateral spherical triangles.

Afternoon Problems.—Mr. Hornbuckle.

THIRD AND FOURTH CLASSES.

1. In what time will the interest of £1. amount to 15s. allowing 4½ per cent. simple interest?

2. Solve the following equations $\frac{16}{x}-\frac{100-9x}{4x^2}=3$

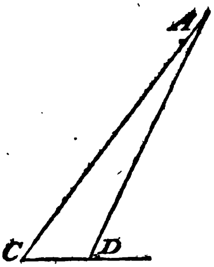
$$\left.\begin{array}{r} x^2y+y^2x=30 \\ \frac{1}{x}+\frac{1}{y}=\frac{5}{6} \end{array}\right\}$$

3. Extract the square root of $7-4\sqrt{3}$.

4. Find, by means of a given circle, two angles whose sines are in the proportion of 9 : 4.

5. Two bodies, *A* and *a*, are projected perpendicularly upwards with the velocities *V* and *v*: How high will their common center of gravity ascend?

6. Determine that part of the inclined plane *AC* through which a body will descend from rest in the time of describing *AD*.



7. Find the focal length of a meniscus whose thickness is inconsiderable.

8. The reflecting curve is the logarithmic spiral and the radiating point in the center. Construct the caustic.

9. At what angle must the rudder of a vessel be inclined to the stream that the effect produced may be a maximum?

10. Prove $\dot{z} = F\dot{x}$, z being the space fallen through by the uniform force, 1, to acquire the velocity.

11. Prove the differential method by the method of increments.

12. A cylindrical tube, 40 inches long, is half filled with mercury and then inverted: How high will the mercury stand, the standard altitude being supposed 30 inches.

13. Required the velocity with which the air will rush into an exhausted receiver.

14. Find the fluents of $x\dot{x}\sqrt{a^2 - x^2}$, $\dfrac{\dot{x}}{x\sqrt{x-a}}$, $a^x\dot{x}$.

15. Investigate Cardan's rule for the solution of a cubic equation, and shew that it fails if all the roots are possible.

16. Shew that the general equation to the apsides can have but four possible roots.

17. Shew where an inferior planet is a morning or evening star.

18. Prove that when Aries rises the ecliptic makes the least angle with the horizon, and that this angle continually increases to its setting.

19. Render Newton's expressions for the law of force in his second section general.

20. If a body fall from a finite distance, and a given ellipse be described whose axis major is this distance, prove that the area described by the radius

vector SD is equal to the area described in the same time in a circle at the distance of half the latus rectum of the ellipse from the same center.

Evening Problems.—Mr. Hornbuckle.

1. Find the equated time of payment of two sums S and s, due at T and t years hence respectively, allowing simple interest.

2. A body is projected from the top of a tower of a given height, at a given angle of elevation, and with a given velocity: find the range described on a plane drawn from the base of the tower at any given angle of inclination to the horizon.

3. The circumference of a given circle revolves uniformly about its diameter with a given angular velocity: compare the momentum of the circumference with that of those sides of the circumscribed square which are parallel to the axis of motion.

4. Suppose the axis major of a spheroid : the distance between the foci :: sine of incidence : sine of refraction, and that rays parallel to the major axis are incident on the convex surface; at that point in which any ray is incident draw a tangent to the ellipse, and a perpendicular to the tangent cutting the axis major; also join the point of incidence and each of the foci: it is required to prove, without any other construction, that the ray will be accurately refracted to the farther focus.

5. Sum the following series $\frac{1}{1.2}\times\frac{2}{3}-\frac{1}{2.3}\times\frac{3}{4}+\frac{1}{3.4}\times\frac{4}{5}-\frac{1}{4.5}\times\frac{5}{6}+$ &c. ad inf.

and $\frac{4}{1.2.5}+\frac{5}{2.3.6}+\frac{6}{3.4.7}+$ &c. to n terms and to inf.

6. Given the apparent perpendicular depth of an object under the water, to find the direction in which a ball must be fired from a given situation to hit it, the path of the ball being supposed rectilinear.

7. Investigate the fluxional expression for the content of a solid, and apply it to find the content of that, which is generated by the revolution of a curve about its axis, whose equation is $y=$ hyp. log. $(1+x,)$ x being the abscissa, and y the corresponding ordinate.

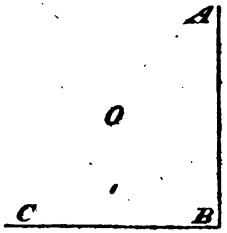
8. Prove that the sum of the infinite series $\frac{1}{1^3}-\frac{1}{3^3}+\frac{1}{5^3}-$ &c. $=\frac{\mathcal{Q}^3}{4}$, $\mathcal{Q}$ being a quadrantal arc to radius 1.

9. The sum of the mth powers of the roots of the equation $x^n-1=0$ is n, if $\frac{m}{n}$ be any whole number; and 0, if it be a fraction. Required a proof.

10. Compare the space described in one second by the force of gravity in any given latitude, with that which would be described in the same time, if the earth did not revolve round its axis.

11. At the extremities of the arms of a given lever are suspended respectively the weights p and q; supposing p to descend, and the lever to revolve round the fulcrum; it is required to determine the angular velocity of the lever at any point of its descent from an horizontal to a vertical position; the inertia of the lever being neglected.

12. Required the length of the longest ladder that can be slided up a wall *AB* from the horizontal plane *CB*, under an obstacle *O* given in position.



13. Prove the diurnal path of the shadow of any object perpendicular to the horizon in all latitudes a straight line, when the sun is in the equinox.

14. The refracting curve is the logarithmic spiral, and the radiating point in the center: construct the caustic.

15. A flexible string of given length is wrapped round a cylinder whose weight and dimensions are given; one end of it being fixed to the surface of the cylinder, and the other to a tack: if the cylinder be suffered to descend by its gravity, it is required to find the time in which the whole string is unwound, and the velocity acquired.

16. Given the force of gravity on the earth's surface; the periodic time of the moon, and her mean distance: it is required to compare the quantities of matter in the moon and earth.

17. Find the fluents of $\frac{a^2x^{-\frac{1}{2}}\dot{x}}{\overline{a+x}|^{\frac{3}{2}}}$, $\frac{x^n\dot{x}}{1+ax+x^2}$, n being a whole number.

18. Construct a vertical east dial.

19. A vessel of given dimensions in the shape of a paraboloid is filled with water, and revolves

uniformly round an axis perpendicular to the horizon. Required the time of rotation that it may just be emptied.

20. Find the fluxional expression for the force tending in lines parallel to the axis of a curve when the oscillations therein are isochronous, and apply it to the catenary.

21. A flag-staff of given height is erected on a tower whose height is also given: at what point on the horizon will the flag-staff appear under the greatest possible angle.

22. Find the pressure sustained by a given horizontal plane; the height of the atmosphere being infinite, and its density being supposed uniform and n times as great as that at the earth's surface.

1804.

Morning Problems.—Mr. Hudson.

FIRST AND SECOND CLASSES.

1. Point out the difference in principles, in exhaustions, indivisibles, prime and ultimate ratios, and the method of fluxions.

2. Find the integral of

$$\overline{x-m}\,.\,\overline{x-5m}+\frac{\overline{x-2m}\,.\,\overline{x-5m}}{2},\text{ the}$$

increment of (x) being expressed by (m).

3. *A* and *B* play, by turns, 2 bowls with equal skill; *A* wants 3 of the game, and *B* 2; find their respective probabilities of winning.

4. Two elastic balls, beginning their motion from different points in the same right line perpendicular to an horizontal plane, are inflected along the plane with the velocities acquired, by a hard plane inclined to their direction at an angle of 45°; given the distance at which one impinges on the other on the horizontal plane, and the point from which one of them descended, to find the point from which the other began its motion.

5. With a given straight line perpendicular to the horizon, as radius, and the lower end as center, describe a circle, and draw a tangent at its extremity; if any radius of this circle represent the position of

an inclined plane, and a body be projected on it with the velocity acquired in falling through the given line, the space described on this plane in the time of its descent will be equal to the radius of the circle, together with the perpendicular drawn from the intersection of the plane and the circle to the tangent.

6. Let the atmosphere be supposed to consist of equally elastic particles, which at different distances repel each other with forces inversely proportional to the squares of the distances between their centers, and let the tube of a barometer be partly filled with mercury, and then its open end immersed in a bason of the same fluid; investigate an equation for finding the height of the mercury in the tube.

7. At a certain place in a given N. latitude, the sum of the sun's declination and altitude was observed at a given hour in the morning; find the sun's altitude and declination.

8. Let a small reflector be moved along an horizontal plane with its surface parallel to it, and let an object move in a straight line perpendicular to the plane, and so as to be always at the same distance as at first from the reflector; find the locus of an eye, which being always equidistant from the reflector, shall see the image.

9. Three known rectilinear objects placed contiguous, and in the same right line, appeared to the eye of a spectator of the same length; find his position.

10. Let a body be projected at an angle of 45° with the horizon, and suppose the arc of the earth's surface intercepted between the points of projection

and incidence to be 60°; find the velocity of projection.

11. Let the earth be supposed a sphere of given magnitude, and to revolve about its axis in a given time; compare the weight of a body at its equator with its weight in a given latitude.

12. Investigate the rule for finding by fluxions the center of oscillation of any line, surface, or solid

13. Find the solid content of a section of a given spheroid made by a plane coincident with the ordinate of a given diameter, and cutting the diameter at a given distance from the center.

14. Find the locus of the vertex of a triangle described on a given base; 1. when the sum of the angles at the base is given: 2. when one of them is always double the other.

Morning Problems.—Mr. Woodhouse.

FIRST AND SECOND CLASSES.

1. Required two geometric means between 10, and 100.

2. $b=\frac{a-\sqrt{a^2-x^2}}{a+\sqrt{a^2-x^2}}$. Required x.

3. Prove that tang. $\frac{A}{2}=\frac{\sin. A}{1+\cos. A}$ (radius 1).

4. Prove that if the difference between the digits of the odd and even places in any number be adjoined to the number, the result is divisible by 11.

5. Suppose a square and its circumscribing circle to revolve round a diagonal of the square; compare the surfaces and solidities of the solids generated.

6. Shew how the circumference of an ellipse may be computed, of which the excentricity is .99, the semi-axis major being 1.

7. Given the force at earth's surface, earth's radius, and moon's distance, to find the moon's periodic time.

8. Find the fluent of

$$\frac{x^2\dot{x}}{(1+x^2)^{\frac{1}{2}}};\ \text{and prove} \int \frac{x^5\dot{x}}{\sqrt{1-x^2}},$$

contained between the values of x, 0 and 1, to equal $\frac{2.4}{3.5}$.

9. Explain the principle on which achromatic telescopes are constructed.

10. If parallel rays fall on equal aperture of spherical reflectors, the lateral aberrations vary inversely as the squares of the radii of the reflectors. Required proof.

11. What sum of money ought to be paid every three years instead of £100. paid annually, the rate of interest being 5 per cent.?

12. Shew that the rectification of the hyperbola may be deduced from that of the ellipse.

13. Shew that if the moon's velocity were increased, her synodic revolution would differ less from her sidereal.

14. In the lemniscata, whose equation is $(x^2+y^2)^2 = x^2-y^2$, it is required to assign two arcs equal to one another.

Afternoon Problems.—Mr. Hudson.

THIRD AND FOURTH CLASSES.

1. In a system of notation whose local value is (a), in any multiple of (a—1) the sum of the digits is either equal to (a—1), or a multiple of it.

2. Any power of a cube root of unity, is itself a cube root of unity.

3. If two circles touch each other, any straight line passing through the point of contact cuts off similar parts of their circumferences.

4. If from the angular points of any plane triangle, three straight lines be drawn through the same point within it to the sides, 6 segments will be formed; shew that the solids, measured by 3 that are not contiguous, are equal.

5. Given the tangents of two arcs of a given circle, to find the tangents of the arcs which are equal to their sum, and difference.

6. A person wishing to determine the height of an obelisk standing on a declivity, measured a given distance from its base, and took its elevation; and going on in the same direction a given distance, took its elevation again; shew how the altitude may be found from these data.

7. Given the perimeter, the vertical angle, and the perpendicular in a plane triangle, to construct it.

8. Solve the equations,

1. $3x^{\frac{5}{3}}+x^{\frac{5}{6}}=3104.$
2. $x^3-\overline{a+p}.x^2+\overline{.ap+q}.x-aq=0.$
3. $x^2+xy=10.$
$y^2+yz=21.$
$z^2+xz=24.$

9. The evolute of a common cycloid is another equal cycloid.

10. On a given straight line perpendicular to the horizon, describe a circle, and draw a tangent at its higher extremity; if any point be assumed in this tangent, and a straight line be drawn from it parallel

the diameter, cutting the circle in two points, and chords be drawn from those points perpendicular to the diameter, the times of describing the parts of this line, together with the times of describing the corresponding chords with the velocities acquired at their extremities, shall be equal.

11. Let the compressive force be supposed proportional to the square of the density, and the force of gravity inversely proportional to the square of the distance from the earth's center; it is required to find the law of the density in the atmosphere.

12. Given the azimuth and altitude of the sun at two different times during the same morning, to determine the latitude of the place.

13. Let the radii of the surfaces of a double convex lens of known refracting power be given, and the positions of the eye and object in the axis of the lens; to compare the apparent magnitudes of the object and image.

14. To an eye that moves in the circumference of a given circle, find where a known rectilinear object given in position in the same plane with the circle will appear a maximum, and where a minimum.

15. Let a weight appended at the circumference of a wheel elevate by its gravity a weight appended at the axle; given the two weights, the weight of the wheel, and the radius of the axle, to find at what distance one of the weights must be applied, so as to raise the other at the axle through a given space in the least time.

16. A body having descended from a given altitude, begins to descend along the arc of a given cycloid whose base coincides with an horizontal plane;

find the points where it will leave the curve, and where it will meet the horizontal plane.

17. Find the ratio of the times of oscillation of a pendulum, at the equator, and at the pole, supposing the earth to be a sphere, and to revolve about its axis in a given time.

18. If the first fluxions of a common ordinate of a curve and a circle be equal, they will have the same tangent at that point; and if the second fluxions be equal, it will be impossible to describe another circle that shall approach nearer to the curve.

19. If (x) increase in geometrical progression, the successive increments of the ratio of (x) to (1) will be equal.

20. Of all cones, of the same solid content and specific gravity, to determine the ratio of the diameter of the base to the altitude in that, which, when immersed with its axis perpendicular to the surface of a given fluid, shall have the surface immersed, a minimum.

21. A body revolving in a given circle, acted on by a force, which is inversely proportional to the square of the distance from the center, in consequence of an impulse in the direction of its motion, begins to describe an orbit of given excentricity; find the velocity communicated to it by the impulse.

22. The given circle described by a body, acted on by a force tending to a point in the periphery, is caused to revolve about the center of force in such a manner that the angular velocity of the body describing it, is to that of a body describing the same orbit when quiescent, in a given ratio; find the equation to the orbit described in fixed space, the law of

force, and velocity of projection at the apsis, by which a body might describe it.

23. Find the point in the moon's orbit, which is here supposed circular, when that part of the ablatitious force which accelerates her motion is a maximum.

24. If two bodies attract each other with forces inversely proportional to the square of the distance between their centers, and be projected in parallel and opposite directions with given velocities, they will describe about their common center of gravity similar figures.

Afternoon Problems.—Mr. Woodhouse.

THIRD AND FOURTH CLASSES.

1. The interior angles of every quadrilateral figure are equal to four right angles. Required proof.

2. Reduce .855 of a foot, to the decimal of a yard.

3. Given the logarithms of 2 and 3, to find the logarithm of 216.

4. What 3 numbers are those that have their differences equal, their sum 15, and sum of cubes 495?

5. Sum $\frac{1}{1}+\frac{1}{4}+\frac{1}{10}+\frac{1}{20}+$ &c.

6. Prove that $\sin.(a+b).\sin.(a-b)=(\sin. a)^2-(\sin. b)^2$.

7. Shew how the focus of a concave lens may practically be found.

8. Explain the principle and use of the hydrostatic balance, and determine the specific gravity of a

piece of silver that weighs 135 grains in air, and 123.3125 in water.

9. Required center of gravity of three equal bodies placed at the three angles of an isosceles right-angled triangle.

10. Shew that there is no finite distance through which a body at rest can fall, so as to acquire the velocity in the logarithmic spiral, the force $\propto \frac{1}{D^3}$.

11. Let a ray of light fall obliquely on a plane refracting surface: determine the position of the refracted ray, the ratio of the sines of incidence and refraction being given.

12. From what argument is it probable that the moon has no atmosphere?

13. Shew the variation of the earth's angular velocity to be nearly twice as great as it would have been, had the earth's motion been uniform.

14. Compare the apparent diameters of the sun at mean and least distance.

15. Two bodies projected along two planes inclined to the horizon at angles 45°, and 30°, describe spaces respectively as $\sqrt{2} : \sqrt{3}$. Required the ratio of the initial velocities of the projected bodies.

16. Let two equal bodies from the vertex of an isosceles triangle, the vertical angle being 120°, move uniformly along the sides; compare the space described by the center of gravity with the space described by either body.

17. Compare the apparent diameters of the sun seen from the earth and Jupiter.

18. In 39th proposition find the area *ATVME* when $DF = a$, a being a given line.

19. What would be the proportion between the axes of the earth's orbit, if the apparent diameter of the sun at mean distance were to his apparent diameter at perigee :: 2 : 5?

Afternoon Problems.—Mr. Hudson.

FIFTH AND SIXTH CLASSES.

1. If the number (2) be divided into any two parts, the difference of the parts is equal to the difference of the numbers, formed by adding each to the square of the other.

2. Solve the equations,

1. $\frac{2x-3}{3} - \frac{10x-4}{18} = -1.$

2. $x^{\frac{6}{5}} + x^{\frac{3}{5}} = 756.$

3. $\overline{x+2}|^2 + \overline{x+2} = 20.$

4. $x + y + \sqrt{xy} = 19.$
$x^2 + y^2 + xy = 133.$

3. The space described by a heavy body in the 4th second, is to the space described in the last second except 4, as 1 to 3; required the whole space described.

4. Let a cubical vessel be filled, half with water, and half with mercury; find the ratio of the pressure on the sides to the pressure on the base.

5. Of all triangles described on the same base, and having the same altitude, the perimeter of the isosceles is least.

6. If the abscissa of an algebraic curve increase uniformly, the deflection from the tangent is ultimately equal to half the quantity that measures the second fluxion of the ordinate.

7. A body is projected at a given point with a given velocity, acted on by a force which varies inversely as the square of the distance from the center; compare the chord of curvature at the point of projection with the distance.

8. A body moves through a given chord of a great circle of the earth in a tube, acted on by a force which is at every point proportional to its distance from the earth's center; find the ratio of the whole time of describing the tube, to the periodic time of a body revolving in a circle at the earth's surface.

9. Given the base, the vertical angle, and the perpendicular, in a plane triangle, to construct it.

Afternoon Problems.—Mr. Woodhouse.

FIFTH AND SIXTH CLASSES.

1. At $3\frac{1}{2}$ per cent. to find the interest of £3. 15s. 4d. for one year.

2. It is required to inscribe in a circle an equiangular and equilateral octagon.

3. Find the time of describing 30 feet on a plane inclined to the horizon at an angle of 30°, the force of gravity being supposed to be diminished by one-fourth of its present quantity.

4. Shew that the velocity of the earth continually increases from the mean to the perihelion distance.

5. Which is greater, $\frac{1}{4}+\frac{1}{8}+\frac{1}{16}+\frac{1}{32}+$ &c. ad inf.

or $\frac{1}{3}+\frac{1}{9}+\frac{1}{27}+\frac{1}{81}+$ &c. ad inf.?

6. Prove that $\cos. 2a = 2\,(\cos. a)^2 - 1$ (radius $= 1$).

7. Find the focal length of a plano-convex lens, the sine of incidence being to the sine of refraction :: 1,5 : 1.

8. Find the fluxion of $\frac{x}{\sqrt{\overline{1+x^2}}}$, and the fluent of $\frac{\dot{y}}{(1+y^2)^{\frac{3}{2}}}$.

9. Compare the pressure on the inner surface of a cylinder filled with water, with the weight of the fluid.

10. The emersion of a satellite of Jupiter is observed to happen at a certain place at 11*h*. 30′. apparent time, and at Greenwich it is calculated to happen at 10*h*.; find the longitude of the place with respect to Greenwich.

Evening Problems.—Mr. Hudson.

FOR THE FIRST SIX CLASSES.

1. Solve the equations,

$$3x^{\frac{4}{3}} - \frac{5x^{\frac{8}{3}}}{2} = -592.$$

$$\overline{x-4}|^{2} + 2.\overline{x-4} = \frac{2}{x} - 1$$

2. Having given the sum and product of two algebraic quantities, investigate the series expressing the sum of their n^{th} powers.

3. Find the sum of the infinite series,

$$\frac{1}{1.2} - \frac{3}{4.5} + \frac{5}{7.8} - \frac{7}{10.11} \text{ \&c.}$$

and n terms of the series,

$$2 + 6 + 14 + 30 + 62 + 126 \text{ \&c.}$$

4. Find the following fluents,

$\dfrac{a^2\dot{x}}{\overline{a+x\,.\,a-x}|^{\frac{3}{2}}}$; and

$\dfrac{z\dot{x}}{\sqrt{2rx-x^2}}$; where $z=$ circular arc whose rad. $=r$, and ver. sine $=x$.

5. Solve the fluxional equation $\dot{x}+x^3\dot{x}=\dot{z}+z\dot{x}$.

6. A person holding two common dice, undertakes to throw both the numbers 5 and 7, at 3 trials; find the odds against him.

7. Find the center and diameter of a circle that touches 3 given circles, each of which touches the other two.

8. If a spheroid be cut by a plane, the section will either be an ellipse or a circle, and all parallel sections will be similar figures.

9. A person standing in the center of a given circle, throws an elastic ball with a given velocity along a plane coinciding with the horizontal radius which is reflected to him by a small hard plane coinciding with the tangent; if the plane be conceived to revolve about the center of the circle, find in fixed space the locus of his position on the plane, when the ball projected with the same velocity, and reflected by the tangent-plane, always returns to his hand in the same time.

10. A ball half elastic having fallen from a given point, at the middle of its descent is projected parallel to the horizon with the velocity acquired; find the position of a hard plane, which, opposed perpendicularly to its motion, will cause it to move to the same point to which it would have descended in the right line, and find the whole time of its motion.

11. To determine the length of a pendulum which, beginning an entire oscillation in a common cycloid from a given point, shall arrive at a given perpendicular to the horizon in less time than any other, beginning an oscillation from the same point.

12. A given parabolic conoid is put into a fluid, and when it is in a position of permanent equilibrium the base is wholly extant, and inclined to the horizon; having given its specific gravity relatively to that of the fluid, it is required to determine the dimensions of the part immersed.

13. The solid described in the last question being excavated, and containing a fluid, has its axis inclined to an horizontal plane till the surface of the fluid passes through one extremity of its base; in this position a hole being made at the extremity of that diameter which passes through the center of the fluid's surface, and the greatest perpendicular distance of the surface from the base being given, it is required to determine the time in which it will be emptied.

14. At any place situated between the equator and the poles, it is required to determine the two hours in the morning, during which the increase of the sun's altitude is greatest and least, on that day when he is in the equinoctial point.

15. At a given place in N. latitude, two stars, the difference of whose right-ascensions is known, are observed to be on the prime vertical at the same time; in this position their distance being observed, it is required to determine their declinations.

16. Given the sun's altitude and declination, and the sum of the azimuth and hour-angle, to determine the latitude of the place.

17. Let a ring of given diameter be held with its plane perpendicular to the surface of a large plane reflector, and let a straight line be drawn from its center perpendicular to its plane; having given the position of the eye in this line, it is required to determine the position and apparent magnitude of the image.

18. Let the surface of a plane reflector be always perpendicular to a line which revolves about one of its extremities, and cuts two other lines given in position; it is required to determine the locus of the reflector, so that an object moving in the intersection of the revolving line with one of the given lines, the image shall move in its intersection with the other.

19. Let the position of the axis of a spherical surface of known refracting power, perpendicular to, and bisecting, a very distant object, be given, and in it the position of the eye and image, and also the apparent magnitudes of the object and image; to determine the magnitude and position of the refracting surface.

20. A body is projected in a given direction, at a known distance from an horizontal plane, with a given velocity, acted on by a force perpendicular to the plane, which is inversely proportional to the square of its distance from the plane; construct the orbit it will describe.

21. It is required to compare the polar and equatorial diameters:—1st. When the length of a degree of latitude, in each of two known places, is given. 2. When the length of a pendulum vibrating seconds, in each of the same two places, is given.

22. Two bodies whose weights are known, lying

on a smooth horizontal plane, are connected by a flexible line passing through a small ring fixed at a given point between them; in this position a given velocity is communicated to one of them in a direction perpendicular to the line that joins their centers, and the other is made to move directly towards the ring: investigate the motion of the projected body, and find the angle described when the other body arrives at the ring.

Evening Problems.—Mr. Woodhouse.

1. What is the interest of £315. 10s. for one year, at 4¼ per cent.?

2. Of all triangles that can be formed by two given sides containing a variable angle, the greatest is that in which the contained angle is a right-angle.

3. Find the present value of £20. to be paid at the end of every five years, at 5 per cent. rate of interest.

4. Prove that

$$\frac{\sin.(a-b)}{\sin.a.\sin.b}+\frac{\sin.(b-c)}{\sin.b.\sin.c}+\frac{\sin.(c-a)}{\sin.c.\sin.a}=0.$$

5. If any triangular number be multiplied by 8 and increased by 1, the result is a square number. Required proof.

6. In a triangular pyramid, the sum of the squares of the faces that are perpendicular to each other, equals the square of the remaining face.

7. With two dice, compare the chance of throwing at one throw, an ace, with the chance of throwing five points.

8. If a body suspended by a string oscillates through a quadrant (the extremity of the quadrant being the lowest point,) the force stretching the string at the lowest point is three times that which is due to the weight of the body. Required proof.

9. In a circle, compare the time of falling down a chord of 60° to the extremity of a diameter perpendicular the horizon, with the time of the oscillation of a pendulum equal in length to the chord.

10. Under an exhausted receiver a sphere sinks to a depth $=\frac{3}{4}$ diameter. Required the alteration in the depth of the immersion, when the air (its specific gravity being 0.00122) is admitted.

11. Let parallel rays fall on a spherical refractor, determine by construction the position of the refracted ray, and shew that it cuts the axis in a point nearer the surface, than any other ray does less remote.

12. Let the distance between two thin and equal plano-convex glass lenses, be equal radius of convex surface, determine the focus of parallel rays after refraction at each lens.

13. The excentricity of the earth's orbit being small, the variation of the angular velocity is nearly proportional to the cosine of the angle made by the radius vector and perihelion distance. Required a proof.

14. From the poles to the equator, the decrease of the length of a pendulum always vibrating in the same time, varies as the square of the cosine of latitude. Required proof.

15. If the altitude of a wave compared with its breadth be small, the wave moves over a space equal

to its breadth, nearly in the same time that a pendulum, equal in length to the breadth of the wave, performs one oscillation. Required proof.

16. In the astronomical telescope, shew that, with a given object-glass, the magnifying power is increased, by increasing the convexity of the eye-glass; and explain what circumstances confine the increase of the convexity within certain limits.

17. In an elliptical orbit, if a be the semi-axis major, e the excentricity, u the angle contained between the radius vector and perihelion distance, then $r = \frac{a.(1-e^2)}{1+e.\cos. u}$. Required proof.

18. Find fluents of $\frac{\dot{x}}{x^3\sqrt{1-x^2}}$ and of $(\sin. z)^4\dot{z}$.

19. Prove that $\int \frac{\dot{x}}{\sqrt{1-x^4}}$ contained between the values of x, 0 and 1, $= \left(1 - \frac{1}{2^2} + \frac{1^2.3^2}{2^2.4^2} - \frac{1^2.3^2.5^2}{2^2.4^2.6^2} + \&c.\right)\pi$, π being $= \frac{3.14159}{2}$.

20. $\text{Sin.} 3a + \sin. 5a + \sin. 7a + \&c. \sin. (2m-1)a = \frac{\sin. (m+1)a.\sin. (m-1)a}{\sin. a}$. Required proof.

21. It is required to divide the quadrantal arc of an ellipse in such a manner, that the difference of the arcs may equal the difference of the semi-axes.

22. The sum of the squares of the coefficients of a binomial whose exponent is n, (n an integer,) equals the coefficient of the middle term of a binomial whose exponent is $2n$. Required proof.

23. Let two weights fastened to equal strings (l, l) move in a vertical plane, the one oscillating, the other

revolving, and at the lowest points let the velocities due to heights h, h', be such, that $\frac{h}{2l}=\frac{2l}{h'}=m^2$, then the time of the revolution of one weight is to the time of oscillation of the other as m to 1. Required proof.

24. The periodic times of planets revolving in elliptical orbits are independent of the excentricities of those orbits. Required proof.

1805.

First Morning.—Mr. Hornbuckle.

MONDAY, JANUARY 14, 1805.

1. The discount on a promissory note of £100. payable a year and a half hence, amounted to £7. 10s. What interest per cent. did the banker make of his money?

2. Prove that a table of sines and cosines constructed for 45°, will be sufficient to exhibit the sine or cosine of any arc in the circle.

3. Divide a given arc (A) less than a quadrant into two such parts, that the secant of one multiplied into the square of the secant of the other may be a maximum.

4. Find the principal focus of a plano-convex glass lens, and prove it a fixed point.

5. Suppose $A =$ the sum of the roots of an equation, B the sum of the squares, C the sum of the cubes, &c.; required an expression equal to $A + B + C +$ &c.

6. In a given latitude, it is required to determine the declination of the sun, that it may set in the S. W. point.

7. Two bodies, whose weights are 4lb. and 3lb. are projected together at an angle of 45° to the horizon, with the respective velocities of 19 and 12 feet

in a second; required the path described by their common centre of gravity, and its greatest height above the horizontal plane.

8. Find the present worth of an annuity of (A) pounds, to begin (n) years hence, and contiuue (t) years at compound interest.

9. The refracting curve is the logarithmic spiral, and the radiating point in the center; construct the caustic.

10. Given the velocity of the wind, the angular motion of the sails of a windmill, and their inclination; required the length of the arms, that the effect produced by the wind may be the greatest.

11. Sum the following series $\frac{1 . 2}{2 . 3} - \frac{2 . 3}{3 . 4} + \frac{3 . 4}{4 . 5} - \frac{4 . 5}{5 . 6} + \&c.$ and $\frac{10}{1 . 2 . 3 . 4} + \frac{14}{2 . 3 . 4 . 5} + \frac{18}{3 . 4 . 5 . 6}$ ad inf.

12. A given body impelled by the uniform force of gravity descends in a medium wherein the resistance varies as the velocity. It is required to exhibit the relation between the spaces, velocities, and times, by means of the logarithmic curve.

13. Find where the effect of the ablatitious force to accelerate a body's motion in its orbit is a maximum.

14. The distance between the 10 and 11 o'clock hour-line on a vertical east dial is 3 inches in length; required the height of the style.

First afternoon.—Mr. Hornbuckle.

FOR THE THIRD, FOURTH, FIFTH, AND SIXTH CLASSES.

1. If 7 horses eat 16 acres of grass in 20 days, how many will be required to eat 24 acres in 7 days?

2. Add together $\frac{3}{4}$ of 5s. 6d., $\frac{2}{3}$ of $\frac{1}{5}$ of 17s. 2¼d., and $\frac{5}{7}$ of £5. 6s. 7¼d.

3. If a solid angle be contained by three plane angles, any two of these are greater than the third.

4. Prove that the sum of the tangents of two arcs is to the difference as the sine of the sum of these arcs is to the sine of the difference.

5. Solve the equation $x^3-3x^2-4x+12=0$.

6. Find the quantity $\mathcal{Q}$, so that $\mathcal{Q}.\overline{A^2-B^2}$ may be a perfect c^{th} power.

7. Find the centre of gyration in a circle which revolves round an axis passing through its center perpendicular to its plane.

8. Find the radius of curvature at any point of the cycloid.

9. Find the time of flight of a body projected at an angle of 30° with a velocity of 193 feet in a second, the mark being in a plane inclined at an angle of 60°.

10. Prove that the sun's image through a convex lens is a circle, and find how the density of rays therein varies.

11. Three persons divide a cylindrical pipe of wine between them, which is emptied through a small orifice in the bottom in 3 quarters of an hour, each taking as his portion what is emptied in 1 quarter of an hour. In what proportion must they pay for it?

12. Explain the principle of the hydrometer, and shew, that if it be made to sink to the same depth in different fluids, the specific gravities of the fluids will be as the weights of the instrument.

13. Find the proportion in which the spaces occupied by the air in the gauge decrease after each turn of the piston in a condenser.

14. In what part of his orbit is the brightness of Mars the least?

15. Shew where a superior planet is a morning or evening star.

16. Find the solar ecliptic limits.

17. Compare the angular velocity of the distance with the angular velocity of the perpendicular, in general, and in the conic sections.

18. Investigate the expression for the difference of the forces when the movable orbit is an ellipse with the center of force in the center.

19. How must the force of gravity be altered that the times of oscillation in a circular arc may be equal.

20. Find the fluxions of $\overline{a+bx+cx^2}|^{\frac{1}{2}}$, $\frac{1}{\sqrt{a+x}}$, and $\overline{a^x}|^{x}$.

21. Find the following fluents $\frac{2a\dot{x}}{x\sqrt{a^2+x^2}}$, and $\frac{rx^{\frac{1}{2}}\dot{x}}{\sqrt{r^3-x^3}}$.

22. Determine the apparent path of a star's aberration parallel to the ecliptic, supposing the earth to describe any one of the conic sections.

First Afternoon.—Mr. Hornbuckle.

FOR THE FIFTH AND SIXTH CLASSES.

1. Find the chord of curvature, at any point of a parabola, parallel to it axis.

2. Find the altitude, horizontal range, and time, supposing a body to be projected at a given angle with a given velocity.

3. Prove that the density of the air is proportional to its compressing force.

4. Prove the rule for division of fractions.

5. Find the equation of limits to the general equation $x^n - px^{n-1} + qx^{n-2} - \&c. = 0$.

6. Find the law of force tending to the center of the logarithmic spiral.

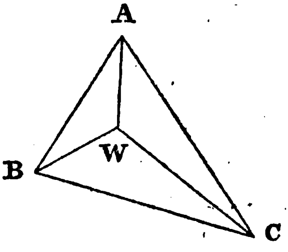
First Evening.—Mr. Sowerby.

1. It is required to find all the possible values of any two numbers X and Y, so that the difference of their squares may be equal to the square of 24.

2. Of all the lines drawn through the focus of an ellipse, and terminated both ways by its perimeter, that is the least which is perpendicular to the major axis. Required a demonstration.

3. It is required to determine that arc of a given circle, whose cosine is equal to its tangent.

4. Let a given weight (W) be supported by three props A, B, C, as in the annexed figure. The pressure upon each prop is proportional to the area of the triangle opposite to it; that is, the pressure on A : pressure on B :: area of the triangle BWC : area of the triangle AWC.



5. Given the length of a cylindrical beam, having its ends placed upon two planes inclined to the horizon at given angles. It is required to find the position in which the beam will rest.

6. A lever whose arms are inclined to each other at a given angle, and whose lengths and weights are respectively known, is made to vibrate flatways round an axis of suspension which passes through the angular point of the lever. It is required to determine the actual time of an oscillation.

7. A cone of given dimensions is filled with fluid, and placed with its slant side parallel to the horizon. How long will the fluid be in running out of it, through a given orifice in the vertex?

8. The velocity and direction of the wind being known, and also the velocity and direction of a ship in motion; it is required to find the position of the sail with respect to the wind, so that the ship may be impelled with the greatest force possible.

9. Given the difference of the times of setting of two stars whose declinations are known. It is required to determine the latitude of the place.

10. Supposing the latitude and longitude of a star to be known; it is required to determine at what hour it will pass the meridian on that day, when its apparent latitude is neither increased nor diminished by the aberration.

11. In the latitude of 52°, the substyle-line of a vertical dial coincides exactly with the hour-line of 11 o'clock. What is the position of the plane of the dial?

12. A cylindrical vessel of given dimensions is filled with water, and placed with its side perpendi-

cular to the horizon. At what distance from the vessel must a person stand, so that he may just see the center of the base of the cylinder; the ratio of the sines of incidence and refraction being given; and also the height of the eye above the surface of the fluid?

13. Supposing that the periodic times of two bodies revolving in a given circle are the same, and that the one is acted upon by a force situated in the center, the other by a force situated in the circumference; what is the relation of the absolute forces?

14. What must be the law of the force acting upon a body in a logarithmic spiral, so as to cause it to descend from any point in the curve to the center, always in the same time?

15. Supposing a repulsive force to vary inversely as the cube of the distance from a given plane; it is required to determine the trajectory described by a body projected with a given velocity, and at a given distance from the plane, in the direction of a line parallel to the plane.

16. Supposing the earth and moon to move in circular orbits, and that the radii of their orbits and periodic times are known; it is required to determine whether the moon's orbit, in fixt space, is concave or convex to the sun, when the moon is in conjunction.

17. It is required to determine the law of the resistance (according to the method of NEWTON, Vol. II. Sec. 4) by which a body may be made to revolve in a parabola round a center of force situated in its focus, the force varying as any power of the distance.

18. In the equation $\frac{p\dot{x}}{x}+\frac{r\dot{y}}{y}=\frac{x^m\dot{x}}{ay^n}$; it is required to find the relation between x and y, when p and r are any numbers whatever.

19. Find the following fluents:

I. $\frac{\dot{x}}{x}.\overline{a^2+x^2}|^{\frac{5}{2}}$.

II. $V^2\dot{x}$, where $V=$hyp. log. $\overline{1+x}$.

III. $Xx^2\dot{x}$, where X is a circular arc whose radius $=1$, and tangent $=\sqrt{\frac{x}{r}}$.

20. Sum the following series:

I. $\frac{1}{1.5}-\frac{1}{2.6}+\frac{1}{3.7}-$&c. to n terms.

II. Given the sum of the series $\frac{1}{1^2}+\frac{1}{2^2}+\frac{1}{3^2}+\frac{1}{4^2}+$ &c. to find the sum of the series $\frac{1}{1.2^2.3^2}+\frac{1}{2.3^2.4^2}+\frac{1}{3.4^2.5^2}$&c.

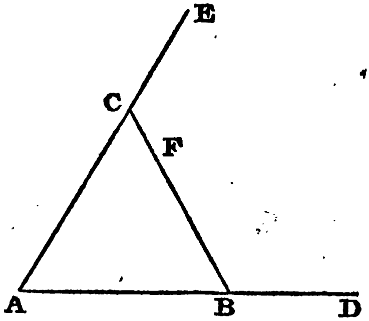
21. Required the nature of the curve along which a heavy body, descending by the force of gravity, will press upon the curve at any point, with a force proportional to the ordinate at that point.

22. It is required to determine that point in a parabola, to which a line drawn from the vertex makes the greatest angle with the curve.

23. A ship sails from the equator on a N. W. course. What number of miles will she have run when arrived at the pole, and what will be her difference of longitude?

24. Let AD, AE be two lines given in position; and let the line BC be moved between them so as

always to cut off an area *ABC* equal to a given area. It is required to find the nature of the curve generated by a point *F*, which divides the line *BC* in any given ratio.



25. Let the roots of the equation $x^n - px^{n-1} + qx^{n-2} - \&c. = 0$, be a, b, c, &c. and those of the equation $nx^{n-1} - \overline{n-1}\,.\,px^{n-2} + \overline{n-2}\,.\,qx^{n-3} - \&c. = 0$, be α, β, γ, &c.; then, if when α, β, γ, &c. are successively substituted in the equation $x^n - px^{n-1} + qx^{n-2}\ \&c. = 0$, the results are P, Q, R, &c. and when a, b, c, &c. are substituted in the equation $nx^{n-1} - \overline{n-1}\,.\,px^{n-2} - \overline{n-2}\,.\,qx^{n-3} - \&c. = 0$, the results are p, q, r, &c. it will be as $P \times Q \times R$, &c. : $p \times q \times r$, &c. :: $1 : n^n$.

Second Morning.—Mr. Sowerby.

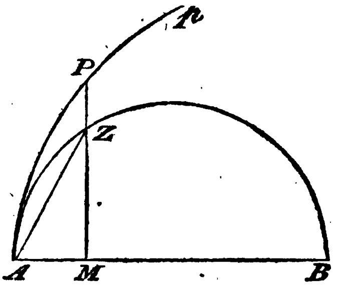
TUESDAY, JANUARY 15, 1805.

1. If a series of arcs be taken in arithmetic progression, the radius of the circle, will be to twice the cosine of their common difference, as the sine of any one arc taken as a mean, to the sum of the sines of any two equidistant extremes. Prove this proposition; and shew how, by means of this property, a table of sines, tangents, &c. may be constructed.

2. Find the sum of n terms of the series $\frac{5.6}{1.2.3.4} + \frac{6.7.}{2.3.4.5} + \frac{7.8.}{3.4.5.6} + \&c.$

3. Suppose a person of given weight to be suspended in a scale from the extremity of an immoveable lever, and to press upwards, by means of a rod of a given length, against the under-side of the lever; with what force must he press upwards, so that he may rest in any given position?

4. The curve *APp* is generated by taking its ordinate *MP* always equal to the corresponding chord of the circular arc *AZ*. Required its nature, and also its area, supposing it to terminate when its abscissa *AM* becomes equal to the diameter *AB* of the circle.



5. If a sphere and cylinder of the same diameter move with equal velocities in the same fluid, in the direction of the cylinder's axis, the resistance opposed to the motion of the globe will be to the resistance opposed to the cylinder in the ratio of one to two. Required a demonstration.

6. Given the greatest and least horizontal parallaxes of the moon. It is required to find her mean distance in terms of the radius of the earth.

7. To determine the *nature* and *length* of the caustic, when the reflecting curve is a circular arc, and the focus of incident rays is in the circumference of the circle.

8. A body is projected, at a given distance from a centre of force, with a velocity and direction which will cause it to move in the reciprocal spiral, the force varying inversely as the cube of the distance. It is required to investigate Cotes's construction for determining the place of the body at the end of any given time.

9. Given the densities of the earth and Jupiter, the times of their diurnal revolutions, and the polar and equatorial diameters of the earth, to find the ratio between the polar and equatorial diameters of Jupiter.

10. Explain the CARTESIAN hypothesis of vertices, and shew that it will not satisfactorily account for the phænomena of the heavenly bodies.

11. Given the latitudes and longitudes of two places upon the surface of the earth. It is required to determine their distance from each other upon MERCATOR'S chart.

12. Supposing the sections of a groin, made by a plane passing through its axis, and cutting the opposite sides of the base at right angles, to be circles; what will be the nature of the section when the plane cuts the sides of the base at any other angle?

13. Given the latitude of the place, the declination of the sun, and the position of a plane, both with respect to the meridian, and the horizon. It is required to find at what hour of the day the sun will begin to shine upon it.

14. If the cover of a common lamp in the streets be a perfect circle, whose plane is perpendicular to the wall to which the lamp is attached; what will be the nature of its shadow on the wall, supposing the wick to be a point situate in the axis of the cover?

Second Afternoon.—Mr. Sowerby.

FOR THE THIRD, FOURTH, FIFTH, AND SIXTH CLASSES.

1. Find the vulgar fraction which is equivalent to the circulating decimal ,7485353.

2. In the extraction of the square roots of numbers, it is required to investigate the limit which the remainder after any operation can never exceed.

3. Find the roots of the equation $x^3+\frac{10}{7}x^2-\frac{4000}{9261}=0$, two of them being equal.

4. A weight *(P)* draws another weight *(W)* along an inclined plane given in position, by means of a rope passing over a fixt pully. It is required to find the position of the weight when in equilibrio.

5. In what direction must a ray issuing from a given point be incident upon a given plane refracting surface, so that after refraction it may converge to another given point in the axis of the pencil.

6. In determining the velocity of a fluid issuing from an orifice in the bottom of a vessel, some writers have found it to be that which a heavy body would acquire in falling through the whole height of the fluid in the vessel; others, that acquired in falling through half the height. How have these different conclusions been obtained, and which is the true one?

7. Suppose a person suspended in a balance to act upwards, by means of a rod against a point in the arm of the lever opposite to that in which he is suspended: will his weight be increased or diminished by this action, and in what ratio?

8. Supposing that in the GREGORIAN telescope the focal lengths of the reflectors are given, and also the distance of the last image from the principal focus of the large reflector. It is required to determine the distance of the reflectors from each other.

9. Explain the phænomenon of the harvest moon.

10. Given the difference of the lengths of the shadow of a lofty tower observed at mid-day, in the summer and winter solstices, and also the latitude of the place. It is required to determine the height of the tower.

11. In any conic section, the centripetal is to the centrifugal force as the distance of the body from the focus to half the principal latus rectum of the figure.

12. How far must a body fall *internally*, and how far *externally*, to acquire the velocity which is necessary to retain it in a circle, supposing it in both cases to be acted upon by a force which varies inversely as the square of the distance?

13. Supposing the force in any orbit nearly circular to be represented at any point by the quantity $\frac{bA^m + cA^n}{A^3}$, it is required to determine the angle between the apsides.

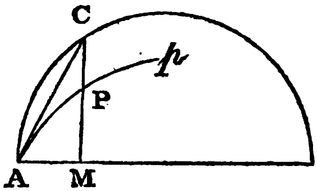
14. Find the sum of n terms of the series, $1.2 + 2.3 + 3.4 + 4.5 +$ &c.

15. To place a given straight line in a circle of

given magnitude, so that it may pass through a given point, either within or without the circle.

16. Find the fluent of $\frac{x^2\dot{x}}{\sqrt{a^2+x^2}}$, and also that of $\frac{\dot{z}}{1+2az+z^2}$, where a is less than unity.

17. Let the curve *APp* be generated by taking the ordinate *MP* always equal to the difference of the chord *AC*, and the versed sine *AM* of the circular arc *AC*. It is required to determine the greatest ordinate of the curve, and also its area.



18. If any momenta be communicated to the parts of a system, its center of gravity will move in the same manner that a body equal to the sum of the bodies in the system would move, were it placed in that center, and the same momenta communicated to it, in the same directions.

19. Let the equation to a curve be $xy^2=a^3$, where x is the abscissa and y the ordinate. It is required to determine the area comprehended between any two ordinates, b and c.

20. The resistance opposed to a plane moving perpendicularly in a fluid with a given velocity, is to the resistance opposed to its motion when moving obliquely, as the cube of the radius to the cube of the sine of the inclination of the plane to the direction of its motion.

Second Afternoon.—Mr. Sowerby.

1. Investigate a rule for extracting the square root of a binomial, one or both of whose factors are quadratic surds; and apply it to determine the square root of $2\sqrt{-1}$.

2. The spaces described in any times by bodies uniformly accelerated, are proportional to the squares of the times, or to the squares of the last acquired velocities.

3. Explain the principle and construction of the air-pump; and compare the density of the air in the receiver at first, with its density after any number of turns.

4. Find the principal focus of a sphere, the radius of the sphere and the ratio of the sines of incidence and refraction being given.

5. Suppose the body to revolve in an ellipse, it is required to find the law of the force tending to the focus.

6. Divide a given angle into two other angles, so that their sines may be to each other in a given ratio; and shew how the value of these angles may be calculated.

Second Evening.—Mr. Hornbuckle.

1. In a given latitude, a pendulum will oscillate once in one second, supposing the earth not to revolve round its axis. Required the angular motion round the axis, that the pendulum may oscillate once in two seconds.

2. $a^x . b^y . c^z$ is a minimum, and $\overline{x+1} . \overline{y+1} . \overline{z+1} = 2$ a constant quantity. Required the relation between x, y, z.

3. Resolve $\frac{1}{1-ez+fz^2-gz^3+\&c.}$ into a series of fractions whose denominators are binomials.

4. Determine the apparent magnitude of a straight rectilinear object, placed at a given depth, parallel to a surface of water; the eye being situated at any point in the plane passing through the object perpendicular to the surface.

5. Two perpendiculars of given lengths are situated at a given distance from each other in a horizontal plane. Determine geometrically that point on the plane between them, to which, if lines be drawn from the extremity of each perpendicular, the times of falling down the two inclined planes may be equal.

6. Find the center of gravity of a cylindrical portion of the atmosphere measured from the earth's surface, the force of gravity being constant.

7. If the ordinate (y) of a curve be composed of powers of the abscissa x and constant quantities; having given the increment of x, find the contemporary increment of y.

8. A string of given length is suspended to two tacks any where situated, the length of the string being greater than the distance between them. It is required to find the position of a given weight (w), which slides freely on the string, when at rest.

9. Construct the spiral in which the areas are the measures of the ratios between the ordinates which terminate them.

10. The angle between the apsides in an orbit very nearly circular : 180° :: $\sqrt{b+c}$: $\sqrt{mb+nc}$. Prove that the law of the force hence deduced by NEWTON'S method coincides with $\frac{bA^m+cA^n}{A^3}$.

11. Required the time in which a given cylindrical wheel will roll from the top of a given conical hill to the bottom.

12. Required the present value of £1. to be paid at the end of *n* years, if either of the individuals *A* or *B*, whose ages are given, be alive at that time.

13. It is required to find the altitude of the first point of Aries, at a given hour, day, and place; the angle also, and point in which the ecliptic cuts the horizon at that time.

14. Given the length and weight of an elastic string, and the force which stretches it, to find the number of vibrations in a second.

15. Construct the fluent $\frac{\dot{z}}{z + 2az^2 + z^3}$, *a* being less than unity.

16. A reservoir being supplied with water at a given rate, determine the height to which a sluice must be drawn, that the reservoir may be always kept just full; the dimensions of the sluice, and the depth of its base from the surface, being given.

17. Explain the reason why at spring-tides in summer, in north latitudes, the afternoon tide is greater than the morning tide.

18. A particle is attracted towards a straight line given in position and magnitude, the law of the force being the inverse square of the distance. Determine the direction in which the particle will begin to move towards the line.

19. Find the fluents of the following quantities $\dot{x} \cdot \int \dot{x} \cdot \int \dot{x} \cdot \int \dot{x}$; $x^a . a^x \dot{x}$ (*a* being a given quantity;) $\frac{\dot{x}}{\overline{x-a}|^2 \cdot \overline{x-b}|^3}$.

20. Find the integral of the increment $\frac{1}{V\,V_2\,V_5}$, V being one.

21. The roots of the quadratic equation $x^2 - px + 1 = 0$ are a and b. Prove that $a^n + b^n$ is equal to

$$p^n - np^{n-2} + n\,.\,\frac{n-3}{2}\,p^{n-4} - n.\,\frac{n-4}{2}\,.\,\frac{n-5}{3}\,p^{n-6}$$

+&c.

22. Bradley observed, that the apparent motion in declination of every star tended the same way when they passed the meridian at the same hour, each being farthest north when it passed at six o'clock in the evening, and farthest south at six in the morning. Explain the reason why this is nearly true in those stars whose declinations are not very great.

23. A ball is shot from a cannon with a given velocity, at a given angle of elevation, situated at a given distance from the foot of a hill, whose elevation is also known. Determine the point in which the ball will strike the hill.

24. Given the force of gravity at the surface of a primary planet, the mean distance and periodic time of its secondary with the ratio of their respective diameters. It is required to compare their densities.

1806.

First Morning.—Mr. J. Brown.

MONDAY, JANUARY 13, 1806.

1. How many years' purchase is an estate worth, when the rate of interest is 4 per cent.?

2. An inclined plane is a tangent to a cycloid in the middle point between the highest and lowest points; what must be the length of the plane, that the time of falling down it may be equal to the time of half an oscillation?

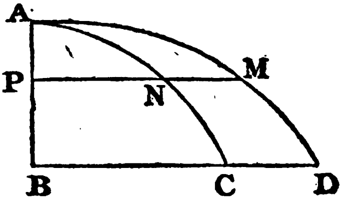
3. Having given the specific gravities of water and iron, it is required to determine what proportion the thickness of an hollow iron globe must bear to its diameter, that it may just float in water.

4. In a given latitude, and at a given time of the year, how many hours will be shewn upon a vertical south dial? And at what time of the year will the greatest number be shewn?

5. Having given the altitudes of the sun, and of any particular colour in the primary rainbow, it is required to determine the sines of incidence and refraction.

6. The curve ANC is a cycloid, and the curve AMD is formed by taking PM equal to the arc

AN; find the equation to the curve, and compare its area with that of the cycloid.



7. Compare the attractions of a spheroid upon a particle on its surface in directions parallel to the polar and equatorial diameters, with the attractions at the pole and the equator.

8. A paraboloid with its vertex downwards is emptied by an orifice in its vertex; compare the times in which the fluid descends through the first and last half of the axis.

9. Draw a diameter to the curve, whose equation is $y^n - \overline{a+bx}\,.y^{n-1} + \&c. = 0$.

10. Sum the following series:

$$1^3 + 2^3 + 3^3 + \&c. \text{ to } n \text{ terms.}$$

$$\frac{1}{1.3} + \frac{1}{2.4} + \frac{1}{3.5} \;\&c. \text{ in inf.}$$

$$\frac{1}{1^2} + \frac{1}{2^2} + \frac{1}{3^2} + \&c. \text{ in inf.}$$

11. Find the following fluents: $\frac{x\dot{x}}{\sqrt{2ax-x^2}}$, $\frac{\dot{x}}{1-x^4}$, $\frac{z\dot{z}}{1+2az+z^2}$, where a is less than unity; and construct the latter.

12. Trace the curve whose equation is $\overline{a^2-x^2+x-b}|^2 = x^2y^2$.

13. Shew that the altitude of high water above the mean altitude is equal to twice the depression below it.

14. Find the radius of curvature of the common parabola, and the equation to the evolute.

15. Shew that if the resistance in any medium is proportional to the velocity, the oscillations in a cycloid will be isochronous.

16. Supposing the moon to revolve round the earth in a circle, what must be the diminution of the quantity of matter in the earth, that the eccentricity of her orbit may be equal to half the radius of her present orbit?

First Afternoon.—Mr. J. Brown.

FOR THE THIRD, FOURTH, FIFTH, AND SIXTH CLASSES.

1. Find the value of .78545454 &c. in a vulgar fraction.

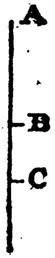
2. If £40. be due at the end of 6 months, £60, at the end of 12 months, and £80. at the end of 15 months; What is the equated time for paying the whole?

3. The sum of four numbers in arithmetical progression is 56, and the sum of their squares is 864; What are the numbers?

4. If the latitude of the place, and the sun's declination be given; it is required to find the time of his rising, his azimuth at that time, and the time of his coming to the prime vertical.

5. A body has fallen from *A* to *B*, when another body is let fall from *C*; How far will

the latter body fall before it is overtaken by the former.



6. If R and r be the radii of the surfaces of a convex lens, and m and n the sines of incidence and refraction; Find the focal length of the lens, and shew that it is the same which ever way the rays pass.

7. Having given the three angles of a spherical triangle, and the radius of the sphere, find the area of the triangle.

8. Find the ecliptic limits of the sun and moon, and how many eclipses there may be in one year.

9. Inscribe the greatest cone in a given sphere.

10. Find how far a body must fall internally to acquire the velocity in a circle, when the force varies inversely as the square of the distance.

11. When a body revolves in any curve, compare the angular velocity of the distance with that of a perpendicular upon the tangent.

12. Shew that the periodic times in all ellipses round the same centre are equal.

13. If the force varies inversely as the cube of the distance, and the whole distance be made the radius of a circle; then, if the versed sine of any angle represent the space fallen through, the right

sine will represent the time, and the tangent the velocity acquired.—Required a proof.

14. Solve the following cubic equation, whose roots are in geometric progression: $x^3-13x^2+39x-27=0$.

15. Shew that the time of an oscillation in a cycloid : time down the axis :: the circumference of a circle : the diameter.—And having given the length of a pendulum, which vibrates seconds, find how far a body will fall by the force of gravity in one second.

16. Compare the times of emptying a cone and its circumscribing cylinder, through equal orifices in the base of the cylinder, and the vertex of the cone.

17. Shew that if no light were intercepted in passing through the air, an object would appear equally bright at all distances.

18. A barometrical tube is 36 inches long, and after inversion the mercury stands at the height of 24 inches; What quantity of air was left in the tube before inversion, supposing the standard height to be 30 inches?

19. Find the following fluents: $\frac{2a\dot{x}}{a^2-x^2}$, $\frac{x^2\dot{x}}{\sqrt{a^2+x^2}}$, and $\frac{\dot{z}}{1+2az+z^2}$, where a is less than unity.

20. Sum the following series:

$$\frac{3}{1.2.2}+\frac{4}{2.3.2^2}+\frac{5}{3.4.2^3}+\text{\&c. in inf.}$$

$$1.2+2.3+3.4+4.5 \text{ \&c. to } n \text{ terms.}$$

21. If a, b, c, &c. be the roots of the equation $x^n - px^{n-1} + qx^{n-2} - \&c. = 0$; it is required to transform it into an equation, whose roots are ma, mb, mc, &c.

22. Shew that the attractions of similar pyramids, whether whole or obtruncated, upon particles situated in their vertices, are proportional to their lengths.

23. At what angle must a body be projected with a given velocity, that the area of the parabola described may be a maximum.

24. Determine the angle between the apsides when the force varies as $\frac{bA^m + cA^n}{A^3}$.

First Evening.—Mr. Barnes.

1. The sum of the cosines of any two arcs, is to their difference, as the co-tangent of half their sum, to the tangent of half their difference.

2. Given the latitude of the place, and the right ascension and declination of a star, to find the hour at which it will rise on a given day.

3. Find the focal length of a thin concavo-convex lens of glass, the radii of the surfaces being given.

4. Construct and investigate the magnifying power of the double microscope.

5. The roots of the equation $4x^3 - 32x^2 - x + 8 = 0$ are of the form $a, -a, b$. It is required to determine them.

6. If a be an integral root of the equation $x^n + px^{n-1} + \&c. \ldots\ldots + Px^3 + Qx^2 + Rx + S = 0$, and if $\frac{S}{a} + R = R'$; $\frac{R'}{a} + Q = Q'$; $\frac{Q'}{a} + P = P'$ &c.;

then there are $\frac{S}{a}$, R', Q', P' &c. integers. Required a demonstration.

7. Given the specific gravities of two bodies, to find the ratio of their quantities of matter, when they balance each other in a fluid whose specific gravity is also given.

8. A given cylindric vessel is supplied with water by a cock at a given rate. Then suppose when the vessel is full, that an aperture of given area is made in its bottom; what is the lowest point to which the surface of the water in the vessel will descend, and also the time of its descent; the influx of the water by the cock being supposed slower than the efflux when the vessel is full?

9. A given weight, suspended by a thread of a given length, oscillates, in the manner of a pendulum, through a semi-circle. Compare the weight of the body with the force which stretches the string in any position.

10. Find the magnitude of that part of the disturbing force of the sun upon the moon, which acts in a direction perpendicular to the plane of the moon's orbit.

11. Required the fluents of $x^3\dot{x} \times \overline{a^2+x^2}|^{\frac{3}{2}}$, $\frac{d \times z^{\frac{1}{2}n-1}\dot{z}}{\overline{a+bz^n}\sqrt{\overline{c+ez^n}}}$, and $\frac{\dot{z}}{z^n \times \overline{a+bz}}$.

12. Find the relation of x to y in the equation $x\dot{y} - y\dot{x} = \dot{x}\sqrt{\overline{x^2+y^2}}$.

13. Required the sum of n terms of the series $1.2.4+2.3.5+3.4.6+$ &c.; and the sum of the series $1+\frac{1}{3.5}+\frac{1}{5.9}+\frac{1}{7.13}+$ &c. ad inf.

14. Given the sum of the series $\frac{1}{1^2}+\frac{1}{2^2}+\frac{1}{3^2}+$ &c. equal to $\frac{2Q^2}{3}$, (Q being the length of the quadrantal arc to the radius $=1$); to find the sum of the series $\frac{1}{1^2.2}+\frac{1}{2^2.3}+\frac{1}{3^2.4}+$ &c. ad inf.

15. The fluent of $y\dot{x}=y\times\frac{x}{1}-\frac{\dot{y}}{\dot{x}}\times\frac{x^2}{1.2}+\frac{\ddot{y}}{\dot{x}^2}\times\frac{x^3}{1.2.3}-$ &c. ($\dot{x}$ being constant); required the investigation.

16 At what distance from its extremities must a slender rod, of uniform thickness and given weight, be suspended, that it may oscillate in a given time?

17. Suppose the proportion of the chances for the happening of an event, be to that of its failing in any one trial as *a* to *b*; what is the probability that the event will happen precisely *p* times in *n* trials?

18. If $\dot{z}$ be constant, $\frac{1}{z}=\frac{1}{\underset{n}{z}}+\frac{n\dot{z}}{\underset{nn+1}{zz}}+\frac{n.\overline{n+1}.\dot{z}^2}{\underset{nn+1n+2}{zzz}}$ + &c. required the investigation.

19. If a body revolve in an ellipse round a center of force situated in the focus; investigate the relation between the mean angular velocity of the body, and its angular velocity round the upper focus; and shew from this relation that when the ellipse is of small excentricity, the angular velocity round the upper focus is nearly uniform.

20. The greatest velocity which can be acquired by a spherical body descending in a fluid, is equal to

that which would be acquired by it in descending from rest in vacuo, by the constant force of its comparative gravity, through a space which is to $\frac{4}{3}$ of the diameter, as the density of the sphere to the density of the fluid.

21. Suppose the force of gravity to be uniform, and to tend perpendicular to the horizon; what will be the path of a projectile in a medium, the resistance of which is proportional to the velocity of the body?

22. If the centripetal force vary reciprocally as the distance from the centre; and the density of the fluid be proportional to the compressing force; then if distances from the centre be taken in geometrical progression, the corresponding densities of the fluid will be also in geometrical progression.

23. Bradley observed that every star passed the meridian farthest south when it came about six in the morning, whatever were its position with respect to the cardinal points of the ecliptic. Suppose then the place of a star to be given; on what day will it pass the meridian of London farthest to the south; and at what hour will it pass it on that day?

24. A perfectly flexible chain is wound round a cylinder supported with its axis parallel to the horizon. Then, if the weight and dimensions of the cylinder be given, and also the length and weight of the chain; it is required to determine the time in which the chain, impelled by the force of gravity, will unwind itself; a given length being unwound at the commencement of the motion.

Second Morning.—Mr. Barnes.

1. Find the value of the decimal ,726363 &c. in a vulgar fraction.

2. Required the value of x in the equation $2x\sqrt[3]{x} - 3x\sqrt[3]{\frac{1}{x}} = 20$.

3. If $x^n - px^{n-1} + qx^{n-2} -$ &c. $\pm W = A$, and a be any root of the equation $x^n - px^{n-1} + qx^{n-2} -$ &c. $\pm W = 0$; Prove that $x - a$ is a divisor of the expression $x^n - px^{n-1} + qx^{n-2} -$ &c. $\pm W$.

4. Suppose the arms of a bent lever, inclined to each other at a given angle at the fulcrum, to be also given: Required the position of the lever, when two given weights, suspended freely from its extremities, balance each other.

5. A given orifice is opened in the bottom of a vessel of given altitude filled with water; What must be the nature and dimensions of the vessel, that the surface of the water may descend with a given uniform velocity?

6. Required the nature of the caustic, when the reflecting curve is the common cycloid, and the rays are incident parallel to the axis.

7. Two stars whose right ascensions and declinations are known, were observed to rise at the same moment: Required the latitude of the place of observation.

8. Prove that the periodic times of bodies, describing different ellipses round different centres of force situated in their foci, are in the sesquiplicate ratio of the major axes directly, and in the sub-duplicate ratio of the absolute forces inversely.

9. Find the fluents of $\frac{x^3\dot{x}}{\sqrt{a^2 - x^2}}$ and of $\frac{\dot{x}}{x^3\sqrt{a^2 - x^2}}$.

10. Required the sum of the first n terms of the series $\frac{1}{1.3}-\frac{1}{2.4}+\frac{1}{3.5}-\frac{1}{4.6}$ &c. n being an even number.

11. Find the sum of the first n terms of the series $\frac{1}{1.2.4}+\frac{1}{2.3.5}+\frac{1}{3.4.6}+$ &c. by the method of increments.

12. Compare the mean quantity of the force by which the sun disturbs the motion of the moon, with the force of gravity at the earth's surface.

13. Compare the force which accelerates the centre of gravity of a cylinder, while it rolls down a given inclined plane, with the weight of the cylinder.

14. Given the latitude of the place, and the right ascension and declination of a star, to determine the time of the year when the star rises with the sun.

Second Afternoon.—Mr. Barnes.

FOR THE THIRD, FOURTH, FIFTH, AND SIXTH CLASSES.

1. What is the interest of £400. for 9 months at $4\frac{1}{4}$ per cent. per annum?

2. What is the discount of the same sum for the same time, at the same rate of interest?

3. Reduce 1.6363 &c. of a crown to the fraction of a guinea.

4. Given $3x^2-3x+6=5\frac{1}{3}$, to find x.

5. Required the sum of n terms of the series, $1-\frac{1}{2}+\frac{1}{4}-\frac{1}{8}+\frac{1}{16}-$ &c.; and also the sum of the series continued ad infinitum.

6. Find the sum of n terms of the series a, $a+b$, $a+2b$, $a+3b$, &c.

7. With what velocity must a body be projected from a given point, in a given direction, to hit a given mark?

8. Given the specific gravity of a fluid, and also of a solid in the form of a paraboloid floating in it with its vertex downwards, to find the part of the axis immersed.

9. Given the distance of the object from a double convex lens, and the ratio of the object to the image; to find the focal length of the lens.

10. If a body revolve in an ellipse round a centre of force situated in one of its foci; prove that the velocity in any point, is to that in a circle at the same distance, in the sub-duplicate ratio of the distance from the other focus,, to half the major axis.

11. Given the latitude of the place, and the declination of the sun, to find the length of the day.

12. If the signs of the alternate terms of an equation beginning with the second, be changed, the signs of all the roots are changed.

13. Required the fluxions of $\frac{a}{\sqrt{x^2+y}}$, and of $\frac{\overline{x+a}|^2}{\sqrt{x^2-a^2}}$.

14. Find the fluents of $\frac{bx\dot{x}}{\sqrt{a+x}}$, and of $\frac{2ax^2\dot{x}}{a^2-x^2}$.

15. If the force vary directly as the distance from the centre, shew that the velocity of a falling body, is to that in a circle at the same distance, as the right sine to the cosine of a circular arc, whose radius is the

greatest distance, and versed sine the space through which the body has fallen.

16. At what season of the year is that part of the equation of time, which arises from the inclination of the ecliptic to the equinoctial, a maximum?

17. If two imperfectly elastic balls strike each other, prove that the relative velocity before impact, is to the relative velocity after, as perfect to imperfect elasticity.

18. If perpendiculars be drawn from any number of bodies to a given plane, the sum of the products of each body multiplied by its perpendicular distance from the plane, is equal to the product of all the bodies multiplied by the perpendicular distance of their common centre of gravity from the plane.

19. Investigate the fluxional expression for the area of any curve; and apply it to find the area of the curve whose equation is $a^m x^n = y^{n+m}$ comprehended between the ordinates, whose lengths are b and c.

20. Find that point in the moon's orbit (supposing it a circle,) where the disturbing force of the sun neither increases nor diminishes the gravitation of the moon towards the earth.

Second Afternoon.—Mr. Barnes.

FIFTH AND SIXTH CLASSES.

1. Reduce $\frac{2}{3}$ of a guinea to the decimal of a pound.

2. Prove the rule for finding the greatest common measure of two numbers.

3. Reduce the fraction $\frac{209}{380}$ to its lowest terms.

4. Required the value of x in the equation $2x^4 - x^2 + 104 = 600$.

5. Prove that if a body be projected in any direction inclined to the horizon, it will describe a parabola.

6. Find the law of the force by which a body is made to revolve in a parabola, round a centre of force situated in the focus.

7. Shew that the pressure of the fluid upon any surface immersed in it, is equal to the weight of a cylindric column of the fluid, whose base is the surface pressed, and altitude the perpendicular depth of the centre of gravity of the surface pressed below the surface of the fluid.

8. Construct and investigate the magnifying power of the common astronomical telescope.

Second Evening.—Mr. J. Brown.

FOR THE FIRST, SECOND, THIRD, AND FOURTH CLASSES.

1. A pendulum, which kept true time at the earth's surface, when carried to the top of a mountain lost n seconds a day; What was the height of the mountain?

2. Having given the places of the sun and moon at any time, it is required to delineate the phases of the moon, and to find the angle which her cusps make with the horizon.

3. Shew in what positions of the eye and object, the image formed by a double convex lens will be magnified or diminished; and when it will be erect, and when inverted.

4. Having given the weight and magnitude of a balloon, and the specific gravities of atmospheric air, and of the air with which the balloon is filled, find the height to which it will ascend.

5. Shew how an eclipse of the moon, with the time of its duration, and the number of digits eclipsed, may be calculated.

6. Compare the times of emptying a globe and its circumscribing cylinder through equal orifices; the orifice of the cylinder being in the base.

7. A given weight P is connected with a cylinder by means of a string wound round it, and descends 48 feet in 2 seconds, causing the cylinder to revolve round its axis; What is the weight of the cylinder?

8. A cylindrical vessel, whose height is equal to its diameter, is filled with water; With what velocity must it be whirled round its axis, that half the water may be thrown out?

9. Approximate to the root of the equation $x^3+x^2+x=90$; and shew that the accuracy of the approximation depends upon the quantity assumed being much nearer to one root than to any other.

10. If the earth and moon were at rest, having given their quantities of matter and densities, it is required to determine the least velocity, with which a body projected from the moon would fall to the earth.

11. If a body be projected from an apse with the velocity acquired in falling from an infinite distance when the force varies inversely as the n^{th} power of the distance; in how many revolutions, or in what parts of a revolution, will it either fall into the centre, or go off to infinity?

12. When a globe oscillates in a resisting medium, having given the diameters of the globe and of the string, compare the resistance upon the string with the resistance upon the globe.

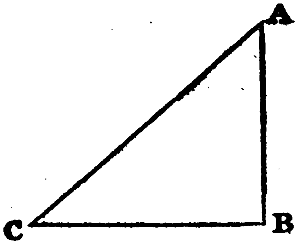
13. Divide a given angle into two such parts, that the cube of the sine of one part multiplied into the square of the sine of the other may be a maximum. And give the geometrical construction for dividing the angle.

14. Resolve the fluxional equation $x\dot{x}+ay\dot{x}-y\dot{y}=1$.

15. Supposing the moon's orbit nearly circular, find the increase of her velocity by the tangential force, while she moves from quadrature to syzygy.

16. Resolve $\frac{1}{1+x^n}$ into its quadratic divisors.

17. The height of the tower *AB* is to be determined by measuring the base *BC*, and taking the angle *ACB*; supposing there to be some small error in the observation, at what distance from the foot of the tower should it be made, that the corresponding error in the height of the tower may be a minimum?



18. Having given the fluent of $\overline{a+cz^n}|^m \times z^{pn-1}\dot{z}$, find the fluent of $\overline{a+cz^n}|^{m+r} \times z^{pn+vn-1}\dot{z}$.

Find the fluent of $v^2\dot{x}$, where $v=$ the hyp. log. of $\overline{x+\sqrt{a^2+x^2}}$.

Find the fluent of $\frac{\dot{x}}{\sqrt{1+a^x}}$.

19. Find the magnifying power, and field view, of Cassegrain's telescope.

20. Sum the following series:

$$\frac{1}{1.5}+\frac{1}{3.7}+\frac{1}{5.9} \text{ to } n \text{ terms, and ad. inf.}$$

$$\frac{1}{1.2}+\frac{1}{3.4}+\frac{1}{5.6}+\frac{1}{7.8} \text{ \&c. ad. inf.}$$

$$\frac{1}{1.2.5}-\frac{1}{2.3.7}+\frac{1}{3.4.9}-\text{\&c. ad. inf.}$$

$$1-\frac{1}{3.3}+\frac{1}{5.3^2}-\frac{1}{7.3^3}+\text{\&c. ad inf.}$$

21. Having given the diameter of a primary planet, and the force of gravity upon its surface, and also the periodic time and distance of the secondary revolving in a circle, to find the quantity of matter in the secondary.

22. Explain the principle of interpolations.—And having given on the 19th of any month, at noon, the sun's declination $=28'.\ 41''$ N.; on the 20th $=5'.\ 0''$ N.; and on the 21st $=18'.\ 41''$ S.; find the time of equinox.

23. Shew that if a globe of fluid matter revolve round its axis, it will put on the form of a spheroid.

24. Shew that every section of a solid formed by the revolution of a conic section round its principal axis is also a conic section.—And if a paraboloid be cut by a plane parallel to its axis, the section will be a parabola similar and equal to the original one.

25. Shew that the area of the least polygon circumscribing a circle : the area of the greatest polygon

of the same number of sides, inscribed in the circle :: $\overline{\text{radius}}|^2 : \overline{\text{cos.}}|^2$ of half the angle subtended by any side.

Mr. J. Brown.—For the Fifth and Sixth Classes.

1. The rectangle contained by the diagonals of a quadrilateral figure inscribed in a circle, is equal to both the rectangles contained by its opposite sides.

2. In the collision of two perfectly elastic bodies, the sum of the products of each body multiplied into the square of its velocity, is the same before and after impact.

3. Shew that, when bodies revolve in circles having the force in centre, the force varies as the radius directly, and the square of the periodic time inversely.

4. Given the sines and cosines of two angles, to find the sines and cosines of their sum and difference.

5. Shew that an arithmetic mean is greater than a geometric one.

6. Sum the following series:

$$12+4+\frac{4}{3}+\frac{4}{9} \text{ \&c. in inf.}$$

$$\frac{1}{1 \cdot 2}+\frac{1}{2 \cdot 3}+\frac{1}{3 \cdot 4} \text{ \&c. in inf.}$$

7. Explain the cause of the change of seasons, and of the difference of the lengths of day and night.

1807.

First Morning.—Mr. D'Oyly.

MONDAY, JANUARY 19, 1807.

1. Find the least whole number, which, when divided by 3 and 5, has its respective remainders 1 and 3.

2. A spherical triangle has its angles 160°, 150°, and 140°. Compare its area with that of a great circle of the same sphere.

3. The equation $x^3+8x^2+20x+16=0$ has two equal roots. Find the three roots of the equation.

4. The sun's right ascension is 40°, and the latitude of the place 52°. Find the ascensional difference.

5. If the force varies as the cube of the distance, how far must a body fall internally to acquire one-third of the velocity in a circle?

6. A lighter fluid rests on a heavier: their specific gravities are respectively 3 and 6. A paraboloid whose equation is $ax=y^4$, floats between them with its vertex downwards, and sinks with one-fourth of its axis in the heavier. Find the specific gravity of the solid.

7. A groin is generated by a square moving parallel to itself, the section through its opposite sides being a semi-cubical parabola. Find the time in which it empties itself through a given hole in the vertex.

8. The periphery of a circle revolves on a diameter for its axis. At what distance from this axis is its centre of gyration?

9. Two telescopes, of Sir I. NEWTON's construction, with equal reflectors, have the same degree of indistinctness. Compare their magnifying powers, and their degrees of brightness.

10. Find the relation of x to y in the equation $a\dot{x}^2 = y\dot{y}^2 - b\dot{x}\dot{y}$.

11. There are 4 individuals, of such an age, that, according to the tables of mortality, it is just an even chance whether each will be alive at the end of a year. What is the probability that two of them will die in that time?

12. Sum the series $\frac{1}{3} + \frac{1.2}{3.4} + \frac{1.2.3}{3.4.5} + \frac{1.2.3.4}{3.4.5.6}$ + &c. ad infin.

also, $\frac{1}{1.5} + \frac{1}{3.7} + \frac{1}{5.9}$ + &c. to n terms.

13. Find fluents of $\frac{x\dot{x}}{\overline{x-a}|^2}$, $\frac{x\dot{x}\sqrt{1-x^2}}{\sqrt{1+x^2}}$, and $\frac{\dot{x}}{\sqrt{1-e^{-mx}}}$, where e is the number whose h. l. is 1.

First Afternoon.—Mr. Woodhouse.

THIRD AND FOURTH CLASSES.

1. Find the interest on 12s. 4d. at $4\frac{1}{2}$ per cent.

2. Given the first term = 1, the number of terms = n, and the sum = S; Find the common difference, the series being arithmetical.

3. Prove that sin. $(60 + A)$ = sin. $(60 - A)$ + sin. A.

4. Prove that

$$\frac{\sin. a+\sin. b}{\cos. a+\cos. b}=\tan. \left(\frac{a+b}{2}\right) \text{ (radius}=1.)$$

5. Compare the sun's apparent diameter at the extremity of the latus rectum of the earth's orbit, with the perigean apparent diameter.

6. If two bodies are moved at the same time towards each other, from the two extremities of a vertical line (L); one projected upwards with a velocity acquired down $\frac{3L}{2}$, the other let fall from rest; It is required to find the point where they meet.

7. A cubical vessel is filled with water, and into its side a bent tube is inserted, filled with water, and communicating with the water in the vessel; Required the pressure on the top of the vessel, the vertical height of the extremity of the tube above the vessel being m times the height of the vessel.

8. Let the focus of incidence Q be ¼ radius from the vertex of a spherical concave reflector; Find the place of q, the focus of reflected rays.

9. Let a weight P, descending vertically, draw Q up an inclined plane, the elevation of which is 30 degrees; Find the velocity of P, after that a time t is elapsed.

10. In NEWT. Prop. 8. Sect. 2. a semi-circle is described by P; what must be the change of circumstances that an ellipse may be described?

11. Find the fluxion of the hyp. log. $\left(\frac{1-x^{\frac{1}{2}}}{1+x^{\frac{1}{2}}}\right)$, and fluent of $x\dot{x}\sqrt{(1+x)}$.

12. Shew by what method the obliquity of the ecliptic is determined.

13. In elastic bodies, shew that, if *A* overtake *B*, the velocity of *B* after impact is greater than the velocity of *A*.

14. Given $\begin{cases}\text{Latitude} = l,\\ \text{Sun's altitude} = a,\\ \text{Comp. declination} = p:\end{cases}$

It is required to prove, that, t being time from noon,

$$\text{ver. sin. } t = 2 \cos.\left(\frac{p+l+a}{2}\right)\sin.\left(\frac{p+l+a}{2}-a\right)$$

$\times \text{cosec. } p.\ \text{sec. } l.$

15. If a point be kept at rest by any number of forces represented by the sides of a polygon, then any one force is equal and opposite to the result of all the other forces. Required proof.

16. Sum $1+3+6+10+15$ &c. to m terms.

17. Let a body be projected from the top of a tower horizontally, with a velocity acquired in falling down a space equal to the height of the tower. At what distance from the base of the tower will it strike the horizon?

18. Sum $1^3+2^3+3^3+\&c.\ldots\ldots n^3$. by the method of increments.

19. In the equation $x^3-\frac{7}{2}x^2+\frac{7}{2}x-1=0$,

two roots are of the form a and $\frac{1}{a}$; It is required to solve the equation.

20. Compare the velocity of a body moving in a parabola, at the vertex, with the velocity at the extremity of the latus rectum; force being in the focus.

21. Let a body revolve in an hyperbola; Required the law of the centrifugal force directed from the center of the hyperbola.

Fifth and Sixth Classes.—Mr. Woodhouse.

1. What is the interest of £1. 1s. 6d. for one year, at 5 per cent.?

2. Find 4 numbers in arithmetical progression, the common difference being 3, and their product 280.

3. Prove, that tan. $2A$ is greater than 2 tan. A, $A \angle 45^\circ$.

4. Let 3 equal bodies be placed in the 3 angles of a triangle; Find their centre of gravity.

5. Compare the velocity of a body at the extremity of the latus rectum of an ellipse, with the velocity at the mean distance; force being in the focus.

6. The specific gravities of mercury and water being as 13568 to 1000; What ought to be the length of a water barometer inclined to the horizon at an angle of 30°, the mercury standing at 30.5 inches?

7. In north latitude 52°. 12′. 36″, and with 1°. 30′. 0″, north declination, how long in 24 hours is the sun above the horizon.

8. Find the fluxion of $\frac{x}{1+x^2}$, and the fluent of $\dot{x}(1+ax)^{-\frac{3}{2}}$.

9. Q, the focus of incidence, is distant 100 radii from the vertex of a concave spherical reflector; Find the place of q, the focus of reflected rays.

10. S, S', S'', are the sums of 3 arithmetical series; 1 is the first term in each, and the respective differences are 1, 2, 3; then

$$S+S''=2S'. \text{ Required proof.}$$

11. ..... $x^2+y^2=5$,
$3xy \quad =6$.
Find x and y.

Evening Problems.—Mr. Woodhouse.

1. Required the amount on £30. 15s. at 3*d.* in the pound.

2. The first term in an arithmetical series is 1; and the difference is *m*; then the sum of *n* terms

$$=\frac{mn^2-(m-2)n}{2}.\text{ Required proof.}$$

3. Let $x^2-px-q=0$, assume $\tan. z=\frac{2\sqrt{q}}{p}$, rad. $=1$; then the two roots of the quadratic are,

$$\frac{p}{2}\tan. z. \operatorname{cotan}. \frac{z}{2}, \text{ and } -\frac{p}{2}\tan. z. \tan. \frac{z}{2}.$$ Required proof.

4. Prove, that in every quadrilateral figure, the sum of the squares of the two diagonals is double of the sum of the squares of the two right lines that join the middle points of the opposite sides.

5. If £1. at compound interest, rate *r*, doubles itself in *n* years; and, rate 2*r* in *m* years; what is the ratio between *n* and *m*? Is it less or greater than, or equal to, the ratio of 2 to 1?

6. If $2\cos.\theta$ be assumed $=u+\frac{1}{u}$, rad. $=1$, then,

$$2\cos. 2\theta=u^2+\frac{1}{u^2},$$

$$2\cos. 3\theta=u^3+\frac{1}{u^3}$$

and generally, $2\cos. n\theta=u^n+\frac{1}{u^n}$. Required proof.

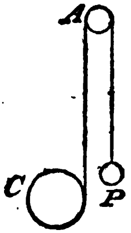
7. Find the fluxion of h. l. $x.e^{\cos. x}$, *e* being the base of the hyp. logarithms.

8. Find the fluents of $\frac{x\dot{x}}{(1+x)^{\frac{1}{2}}}$, and of $\frac{\dot{x}}{1+a.\cos.x}$, $a \angle 1$.

9. A pipe, cylindrical within, is placed vertically, filled with a fluid: What ought to be the law of the increase of the thickness of its sides, that it may be equally strong throughout; the increase of strength being supposed to vary with the increase of thickness?

10. Let two bodies, with velocities v, v', be projected at the same time and towards each other, from the two extremities of a vertical line; then they shall always meet in the middle of the line, if the difference of the squares of the velocities v, v', is equal to the square of a velocity acquired in falling down half the line.

11. The weight P is attached to a string which goes over a fixed pulley at A, and is wound round a thin cylinder C, the weight of which is W. Required P, such, that it shall neither ascend nor descend, whilst C descends by the unwinding of the string.



12. If from the four angles of a pyramid there be drawn lines to its centre of gravity, then a point there placed, shall be kept at rest by forces represented by the 4 lines. Required proof.

13. Let the axis of motion pass through a thin straight rod of uniform thickness and density, dividing the rod into 2 arms that have the ratio of 2 to 1: It is required to find the velocity acquired by the extremity of the longer arm, when the rod shall have moved from an horizontal to a vertical position.

14. If the sine of incidence be to the sine of refraction as 1 : n, then the focal length *(f)* of a double convex lens, may be nearly had from this expression,

$$\frac{1}{f}=\frac{1-n}{n}\left\{\frac{1}{r}+\frac{1}{r'}+\frac{1-n}{r^2}t\right\},$$

r, r' being the radii of the two surfaces, and t a very small quantity, the thickness of the lens. Required proof.

15. Prove, that the earth's angular velocity at mean distance is less than the mean angular velocity.

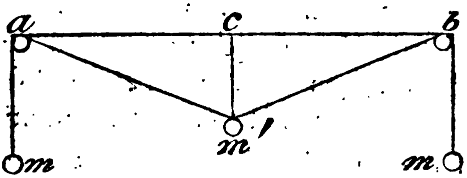
16. Prove, that the augmentation of the sun's apparent diameter from apogee is nearly proportional to the versed sine of angular distance from apogee; the excentricity of the earth's orbit being a small quantity.

17. Given the right ascension and declination of the moon's centre, and of a fixed star; Find their distance.

18. Given the latitude of a place, the sun's declination and altitude; Find the azimuth, and under a form adapted to logarithmic computation.

19. The line of the nodes being in octants, and the body *P*. (NEWT. Sect. 11.) in quadratures, compare the disturbing force that acts perpendicularly to the plane of the orbit, with the like force, when the line of the nodes is in quadratures, and the body in

octants; the inclination of the orbit being supposed to be the same.



20. a, b, are two fixed pullies over which the string passes, to which m, m', m, three equal weights, are fastened: Suppose m' to be let fall from c, it is required to find the distance from c, at which its velocity is the greatest.

21. Let a weight P, fastened to a string going over a wheel, by its descent, cause two weights, Q, Q', to be wound up on two axles. Required the velocity of P, after that it has descended through a space s; the radii of the wheel and of the two axles being r, r', r''.

22. A and B play at a game, each with an equal chance of success, and with this condition; A gives to B a sum S if he loses the first time; $2S$, if he loses two games successively; $4S$, if three games successively, &c.; and $2^{n-1}S$, if he loses n games successively: What sum, on the received principles of chances, ought B to give to A, as an equivalent of the risque he encounters?

Tuesday Morning Papers.—Mr. Woodhouse.

FIRST AND SECOND CLASSES.

1. Given, the logarithm of $8.1213 = .9096256$;

$$\text{It is required to state the logarithms of}\left\{\begin{array}{r}81.213\\812.13\\.81213\\.081213\end{array}\right\}$$

and to prove the justness of the operation.

2. Prove that

$$\tan.(45+A)=\tan.(45-A)+2\tan.2A.$$

3. Prove that the tangential part of the ablatitious force varies as sin. 2θ, θ being the angular distance of P. from quadratures (Newt. Sect. 11.)

4. The force varying as the distance, let a body be projected with a certain velocity, at a given distance *(d)* from the center, at an angle, the sine of which is S; It is required to prove that the orbit described must have an apse.

5. State the usual distinction between apparent solar year, and mean solar year; and explain the cause of their difference.

6. Explain the method of finding the right ascension and declination of a star.

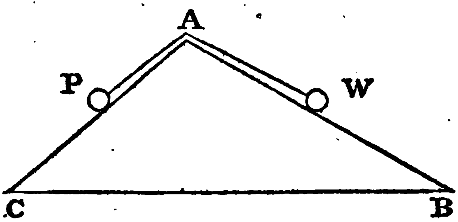
7. Given the right ascension and declination of a star; Find its longitude.

8. Prove that $\int \frac{\dot{z}}{(\cos. nz)^2}=\frac{1}{n}\tan. nz.$

9. If the h. log. of n be given, then the h. log. $(n+1)$ may be conveniently found from this formula:

$$\text{h.log.}(1+n)=\text{h.log.}n+2\left\{\frac{1}{2n+1}+\frac{1}{3}\cdot\frac{1}{(2n+1)^3}+\&c\right\}$$

Required proof.



10. Given the plane AC; It is required to find the elevation of the plane AB, such, that W shall be

drawn by P from the horizontal line BC to the point A in the least time possible.

11. Find the integral of $\frac{4z+3k}{z.(z+k)(z+2k)}$, k being the increment of z.

12. Let $y=\frac{x}{1+x^2}$; trace the curve, find the values of y when a maximum, and at the point of contrary flexure; and find the value of the angle in which the curve cuts the axis at the point of intersection.

13. Investigate a formula for clearing the moon's distance from a star, from the effects of parallax and refraction.

Morning Problems.—Mr. D'Oyly.

THIRD, FOURTH, FIFTH, AND SIXTH CLASSES.

1. What is the discount on £80. 10s. for 3 months, at 3½ per cent.?

2. A clock has two hands, turning on the same centre; the swifter makes a revolution in 5 hours, the slower in 9. If they start from the same point, when will they next meet?

3. Prove NAPIER'S rules for solving a right-angled spherical triangle, in the two cases, in which one of the sides is made the middle part.

4. Prove, that the tan. + cotang. of an arc is equal to twice the cosec. of double the arc.

5. The roots of $x^3-7x^2+14x-8=0$ are in geometrical progression. Find them.

6. Find a number greater than the greatest positive root, and also one less than the least negative root of the equat. $x^3-4x^2-x+20=0$.

7. A lighter fluid, whose specific gravity is 3, rests upon a heavier, whose specific gravity is 7. A paraboloid, with its vertex downwards, rests between them, and sinks with $\frac{1}{4}$ of its axis in the heavier.—Find its specific gravity.

8. Two bodies, P and Q, each 1 lb. in weight, balance on a single pulley. An ounce weight is added to P. How long is it in descending through 12 feet? and what velocity does it acquire?

9. A set of 5 balls, imperfectly elastic, are in a geometrical progression, whose common ratio is 2. The force of elasticity is to the force of compression :: 3 : 2. Compare the velocity of the first with that communicated to the last.

10. The tube of a barometer is 33 inches long. A quarter of an inch of air was left in at the time of inversion. When the mercury in this barometer stands at 28 inches, what is the true standard altitude?

11. Find the latitude of the place, at which the sun sets at 10 o'clock on the longest day.

Tuesday Afternoon.—Mr. D'Oyly.

1. Find two numbers, such, that their difference may be 4, and that twice their product may equal the cube of the less.

2. A curve has its subnormal : $\overline{\text{abscissa}}|^{3}$ :: $2a^2$: 1. Find the equation to the curve; draw a tangent to it, and find its area.

3. Find the focal length of a double convex lens; and shew that in a glass lens, with surfaces equally curved, it is equal to the radius of either surface.

4. When the moon's elongation is 60°, delineate her phase, and prove the area of the enlightened part to be $\frac{1}{3}$ the area of the dark part.

5. A comet is in the perihelion of a given ellipse. Compare its velocity with the velocity it would have in a parabola, at the same perihelion distance.

6. An object is placed before a double concave lens, at the distance of 5 feet, and has the linear magnitude of its image 7 times less than its own.—Find the focal length of the lens.

7. Sum the series $\frac{1}{3} - \frac{1}{3 . 2} + \frac{1}{3 . 2^2} -$ &c. ad infin. also sum n terms of $1^2 + 2^2 + 3^2 + 4^2 +$ &c.

8. Find the fluents of $x^3\dot{x}\sqrt{1-x^2}$, of $\frac{x\dot{x}}{\sqrt{1-x^4}}$, and of $\frac{z\dot{z}}{1+2az+z^2}$, where a is less than unity.

9. Find the relation of x to y in $\sqrt{1+y^2} \times \overline{x\dot{y}+y\dot{x}} = y\dot{y}$.

10. If the 4th power of the periodic times in different circles varies as the cube of the velocities, find how the force, periodic time, and velocity, vary in terms of radius.

11. When a body describes the reciprocal spiral, prove that it makes equal approaches to the center in equal times; and find the area contained between any two distances.

12. In what part of the moon's orbit does the ablatitious force bear to the addititious the proportion of 4 to 3?

Fifth and Sixth Classes.—Mr. D'Oyly.

1. Find the greatest common measure of 720, 336, and 1736.

2. Prove the rule for finding the square root of a binomial surd, and extract the square root of the surd $5 - 2\sqrt{6}$.

3. Shew that in a plane triangle, the base : sum of sides :: difference of sides : difference of segments of base.

4. Find the value of x in $3x+2\sqrt{x}-1=0$.

5. An inclined plane has its length 6 times its height: How long will a body be in falling through 20 feet? and what velocity will it acquire?

6. A body weighing 6 lbs. in air, weighs 2 lbs. in water; another weighing 7 lbs. in air, weighs 4 lbs. in water. Compare their specific gravities.

7. Prove that the periodic times in all ellipses round the same center are equal.

8. Sum $\frac{2}{10}-\frac{2}{100}+\frac{2}{1000}-$ &c. ad infin.

and $5+7+9+11+$ &c. to 50 terms.

9. Find the fluxion of $\frac{x}{\sqrt{1+x^2}}$, and the fluent of $\frac{a\dot{x}}{\sqrt{2ax-x^2}}$.

10. A short-sighted person, who cannot see distinctly beyond 3 feet, wishes to see an object at 14 feet distance. What sort of glass must he use, and what must be its focal length?

Evening Problems.—Mr. D'Oyly.

1. Find the exact value of the decimal .012923 &c. of a pound.

2. Let $x^2y^2+6xy=16$, and $\sqrt{\frac{1}{4x}}=\frac{1}{2}\sqrt{\frac{1}{y-1}}$.

Find corresponding values of x and y.

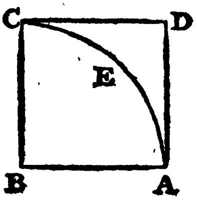
3. The roots of $8x^3-6x^2-3x+1=0$ are in harmonical proportion. Find them.

4. Prove that the perpendicular ascent of an heavenly body is always quickest on the prime vertical.

5. A cylindrical vessel of given diameter is filled with fluid to a certain height; its height is divided at some point. What must be the height of the fluid, and where the point of division, so that the pressures on the base, on the upper surface, and on the lower, may all be equal?

6. Find the attraction of a particle placed in the vertex of a paraboloid, the attraction on each particle being reciprocally as $\overline{\text{dist.}}|^2$.

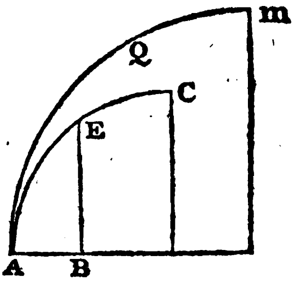
7. The equation to a curve is $y\sqrt{2ax-x^2}=ax$. Find its area; and prove, that when x is equal to a, the whole area equals the excess of *ABCE* above *ADCE*; *AEC* being a quadrant, and *ABCD* a square on *AB*.



8. A body weighing 2lbs. is projected with a velocity 20, at an angle of 60°; another, weighing 3lbs. is at the same time projected at an angle of 30°, with a velocity 25. Trace the motion of their common center of gravity; find the height to which it mounts, and the distance at which it strikes the horizontal plane.

9. *AEC* is a quadrant; the curve *A2m* is traced by taking its abscissa always = arc *AE*, and its ordi-

nate = twice sine EB. Draw a tangent to the curve at any point, and find its area for the whole quadrant.



10. The chances that each of two individuals will die in a certain time are respectively $\frac{5}{6}$ and $\frac{4}{5}$. Find the two probabilities, that they will not both be alive, and that they will not be both dead, at the end of that time.

11. Explain the method of transforming an equation, in which x flows uniformly into one, in which y flows uniformly; and by this method solve the equation $\dot{x}\dot{y} - x\ddot{y} = x\dot{y}^2$.

12. A weight, suspended by a string of given length, is whirled round in a conical motion; that is, it describes, parallel to the horizon, the base of a cone, of which the vertex is the point of suspension. The tension of the string being 3 times the natural weight of the body, in what time does it revolve?

13. A body is projected from an apse with a velocity, which bears to the velocity, in a circle at the same distance, the proportion of 1 to $\sqrt{3}$, force varying as $\frac{1}{D^7}$. Find the angle which it describes round the centre of force, before it falls into it; and

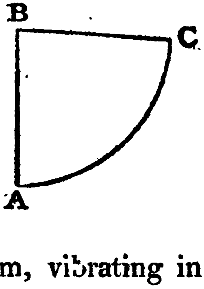
compare the time with the periodic time in a circle at the same distance.

14. A straight line is placed at the distance of 9 inches before a double convex lens, whose focal length is 6 inches. Prove that the image will be a conic section, and determine its major and minor axis.

15. A cylindrical bent tube is partly filled with a fluid, whose surfaces rise and fall alternately. Shew that this fluid librates twice, in the time that a pendulum, whose length equals twice the line of fluid, oscillates once.

16. A chain of uniform thickness, hanging freely, and pliant in every part, forms itself into a cycloid. Required the law of its density and weight.

17. The quadrant *AC* is a thin rod, which revolves on the axis *AB* perpendicular to the horizon. A ring moves freely on the rod. With what velocity must the point *C* revolve, in order that the ring may always remain at the middle of the arc?



18. A pendulum, vibrating in a certain time at the pole of a sphere, vibrates once less in 100 times, when carried to a place 30° from its equator. In what time does the sphere revolve round its axis?

19. Given a star's aberration in latitude and long.; Find the aberration, in declination and right ascension; and explain where a star must be situated, so

as to have the same aberration in latitude and declination.

20. Two globes, of equal weights and diameters, are placed in contact, on a straight rod which passes through both their centers; the point of suspension is distant one diameter from the vertex of the upper one; Find their common center of oscillation.

21. Find fluents of $v^3 x^2 \dot{x}$, where v is h. log. of x; of $\frac{\dot{x}}{x\sqrt{1+\sqrt{x}}}$, and of $vx\dot{x}$, where $v =$ h. l. $\frac{a+x}{a-x}$.

22. Sum the following series:

$$\frac{1}{2}-\frac{1}{2\,.\,2^3}+\frac{1}{2\,.\,2^6}-\text{\&c. ad infin.}$$

$$\frac{2}{1\,.\,3\,.\,4}+\frac{3}{2\,.\,4\,.\,5}+\frac{4}{3\,.\,5\,.\,6}\ \text{\&c. to } n \text{ terms;}$$

and, $1^2+4^2+7^2+10^2\ldots$ to n terms.

23. The powers of the sun and moon to raise a tide being respectively given, and the moon's elongation from the sun; Find the place of the compound high tide.

24. A man descends from an height in the atmosphere, suspended from the center of a plane circle, whose diameter is d. The weight (in air) of himself and the machine is w lbs.; a cubic foot of air weighs every where $1\frac{1}{5}$ oz. and gravity is constant; Find the greatest velocity he can acquire, and shew that he can attain this velocity in no finite time.

1808.

First Morning.—Mr. D'Oyly.

MONDAY, JANUARY 18.—FIRST AND SECOND CLASSES.

1. Prove that the difference of the tangent and co-tangent of an angle is equal to twice the co-tangent of double the angle.

2. Prove Napier's rules for the solution of a right-angled spherical triangle, in the two cases, in which the complement of the hypothenuse is made the middle part.

3. When a pendulous body oscillates in a cycloid, beginning at the highest point, compare the tension of the string at the lowest point, with the tension caused by the natural weight of the body.

4. Find the actual velocity and periodic time of a body revolving at the distance of two of the earth's radii above its surface.

5. A straight rod is suspended at a point, distant $\frac{1}{4}$th of its length from its extremity. Compare the time of its oscillation in this case, with the time of its oscillation when it is suspended at its extremity.

6. Given $a\dot{z} = \overline{by + a^2}|^{\frac{1}{2}}\,\dot{y}$, where z is the arc of a curve, and y the ordinate; find the relation between the ordinate and abscissa.

7. Find the centre of gravity of a given sector of a circle.

8. If two bodies are connected by a lever void of gravity, and a force acts, perpendicular to the line which joins them, at a point which is not their centre of gravity; find the centre of initial rotation.

9. A cylinder, whose radius = 2 feet, and whose weight = 100 lbs. is moveable on its axis. A weight of 1 lb. is suspended at the distance of half its radius from the axis. How long must this weight act, to generate a motion of 10 revolutions in 1″?

10. Affect $\overset{v}{-3}\ \overset{v}{-1}\ \overset{v}{2}$ with v, and reduce it to succeeding values of v.

11. Find fluents of $\overline{\sin. z}|^{4}\dot{z}$, of $\frac{x^m \dot{x}}{\overline{\log. x}|}$, and of $\frac{\dot{x}}{1-x^4}$.

12. Sum $\frac{5}{1.2}\times\frac{1}{3}+\frac{7}{2.3}\times\frac{1}{9}+\frac{9}{3.4}\times\frac{1}{27}+$ &c. to n terms;

and $\frac{1}{1^3}-\frac{1}{3^3}+\frac{1}{5^3}-$ &c. ad inf.

13. Compare the chance of throwing, with a single die, an ace at least 3 times in 5 trials, with the chance of throwing it 3 times exactly in the same number of trials.

First Afternoon.—Mr. Woodhouse.

1. Compare the interest on £350. 15s. at 4½ per cent. with the interest on £450. 15s. at 3½ per cent.

2. Prove, 1st. That three perpendiculars from the angles of a triangle upon the opposite sides intersect each other in the same point.

2dly, That three lines drawn from the three angles of a triangle, and bisecting the opposite sides, intersect each other in a point which is the centre of gravity of the triangle.

3dly, That three lines drawn from the three angles of a triangle, and bisecting those angles, intersect each other in a point, which is the centre of an inscribed circle.

4thly, That three lines bisecting the three sides of a triangle, and drawn perpendicularly to the sides, intersect each other in a point which is the centre of a circumscribed circle.

3. In what point of the cycloid will the force stretching the string, and the force accelerating the body, be equal?

4. If the perihelion distance of a comet moving in a parabolic orbit be 64, the earth's mean distance being 100, compare its velocity at the extremity of the latus rectum with the earth's mean velocity.

5. Compute the value of the tangent of 15°.

6. By what method can the planets' distances from the sun be computed?

7. Find the fluxion of $\left(1-x^{\frac{1}{2}}+x^{\frac{1}{3}}\right)^{\frac{4}{5}}$

and the fluent of $\dfrac{\dot{x}+\frac{1}{3}x\dot{x}}{\sqrt{1+x^2}}$.

8. Place an object 100 feet before a concave spherical reflector, of which the radius is 10 feet; then find the distance between the principal focus and the focus of reflected rays.

9. Define the longitude of a place, and explain by what methods it can be determined.

10. Find the present value of a perpetuity of £5. per annum, to be received at the end of seven years, the rate of interest being 5 per cent.

11. Investigate an expression, from which, a pendulum losing or gaining n seconds in 24 hours may be shortened or lengthened.

12. Explain what is meant by the Aberration of Light?

If from such aberration we perceive the apparent places only of stars, by what means can their real places be assigned?

13. What is the difference between the latera recta of a parabola and ellipse having the same least distance $=1$, the axis major of the ellipse being 300?

14. Given the logarithms of $20=1.30103000$
of $30=1.47712125$
Deduce thence the logarithm of 360.

15. Explain the construction of the horizontal sun-dial; and compute, for the latitude of Cambridge, the hour-angle between 2 and 3.

16. If bodies are imperfectly elastic, shew that the sum of the product of each body into the square of its velocity, before impact, is greater than the sum of the product of each body into the square of its velocity after impact.

17. If the sun's apparent diameter at the extremity of the latus rectum were to his apparent diameter at perigee as 100 : 101, what would be the excentricity of the solar ellipse?

18. Define the centrifugal force; find an expression for the law of its variation; and compare it

with the centripetal force which acts upon a body moving in the logarithmic spiral.

19. Find the nature of the curve, in which the square of the ordinate is a mean proportional, between the area and a given quantity b.

20. Let a body be projected at an angle of 45° with a velocity acquired down the axis of a cycloid. Compare the time of flight with the time of an oscillation.

21. Sum the arithmetical series

$$1+5+9+13 \text{ \&c. to } n \text{ terms.}$$

22. State Napier's rules; and prove their truth, in the case in which the complement of the hypothenuse is the middle part.

23. Find the attraction of a corpuscle situated in the axis of a cylinder towards the cylinder, the particles of which attract according to the law of the inverse square of the distance.

Evening Problems.—Mr. Woodhouse.

1. Define discount; investigate a formula for computing it; and apply such formula to the computation of the discount on £100. due at the end of 3 months.

2. Find the sum of n terms of a series of polygonal numbers, which numbers are formed, by assuming any arithmetical series that has its first term 1, and difference a whole number, and by making, generally, the m^{th} polygonal number equal to the sum of m terms of the arithmetical series.

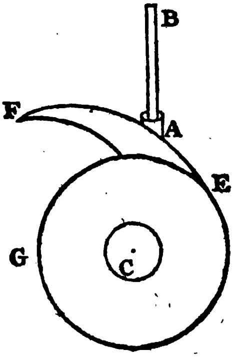
3. By Nautical Almanack, the moon's right ascension was at Midnight, March 10, = 4°. 56′,
Noon, - March 11, = 10°. 34′,
Midnight, March 11, = 16°. 18′.
It is required to find the right ascension March 11, 3^h.

4. The axis of the solar ellipse having a yearly progressive motion of 1′. 2″, and the longitude of the perigee being in 1750, 278°. 37′. 15″; it is required to find the epoch, at which, the axis was perpendicular to the line of the equinoxes.

5. From the two ends of a vertical line, two bodies are, at the same instant, projected towards each other, with velocities v, v'. Required their distance, when half the time, in which they would meet, is elapsed.

6. If a power P descending vertically by means of a string passing over a fixed pulley, elevates a weight W; what will be the pressure sustained by the axis of the pulley?

7. Let the wheel EG revolve round an axis at C. Required the nature of its tooth or *wing* EF, that shall elevate vertically the piston AB through equal spaces, whilst the wheel revolves through equal angles.



8. Given the velocity of sound; find the horizontal range when a ball, at a given angle is so projected towards a person, that the ball, and sound of the discharge, reach him at the same instant.

9. The late comet passed its perihelion Sept. 21, 1807; and the perihelion distance was .64, the earth's mean distance being 1. Required the computation of the velocity with which it is now moving, January 18, 1808; the orbit being supposed to be parabolic.

10. With three dice in one throw, compare the chance of throwing the number 10 with the chance of throwing the number 5.

11. Find the fluent of the fluxional equation $\frac{\ddot{y}}{\dot{t}^2}+a^2y=0$,

and of $\dot{\theta}\sin. m\theta. \sin. n\theta$. (radius $=1$.)

10. Let a square be immersed in a fluid, with its plane perpendicular to the surface. Compare the pressures on the two halves of the square, made by drawing its diagonal.

13. If the fluent of the fluxional equation $p\dot{x}+q\dot{y}=0$ can be assigned, p and q being functions of x and y, then $\frac{\dot{p}}{\dot{y}}=\frac{\dot{q}}{\dot{x}}$. Required proof.

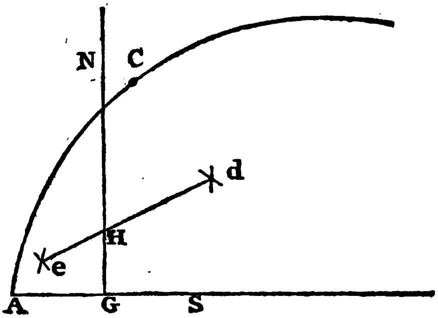
14. Compare the velocity of the moon in octants, with her velocity in syzygies, according to the principles of the 11th section.

15. Find, by the method of increments, the sum of

$$\frac{1}{1.2.3.4}+\frac{3}{2.3.4.5}+\frac{6}{3.4.5.6}+\frac{10}{4.5.6.7}+\&c.$$

the numerators being the second order of figurative numbers.

16. If *C* be the place of a comet in its parabolic orbit, *A* the perihelion, *S* the sun, *G* the middle point between *A* and *S*, *GN* a perpendicular to *AS*; then, if from the centres *C* and *S*, and with any radius, circular arcs be described intersecting each other in *e* and *d*, and *ed* be joined, a point *H* in *GN* is determined, such, that *GH* shall be proportional to the time of the comet's moving through the arc *AC*. Required proof.



17. Let *d* be the distance of the focus of incidence from the centre of a concave reflector, and let a ray be incident on the reflector 60° from its vertex. It is required to find the distance, in the axis of the reflector, between the geometrical focus and the intersection of the reflected ray with the axis.

18. If a pendulum, vibrating through an arc of 2 degrees on each side of the vertical, keep true time, find nearly the error of time introduced by making it vibrate through 2°. 10′.

19. Express the cos. $4x$ in terms involving powers of cos. x.

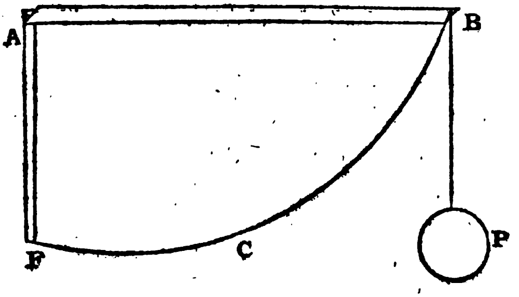
20. Investigate the nature of the curve, of which the normals bear the same relation to the parts of the

abscissa intercepted between the origin of the abscissas and normals, that the ordinates of a common parabola bear to their corresponding abscissas.

21. Suppose a piston, closely fitting a vertical tube, to descend by its weight, the tube being filled with an elastic fluid, and closed at the end opposite to the piston; Find the velocity of the piston after a descent through a space S, not considering the effect of friction.

22. If a body be made to descend obliquely along the concave surface of a vessel, the axis of which is perpendicular to the horizon; then the fluxion of the area, projected upon a plane perpendicular to the axis, is a constant quantity. Required demonstration.

23. *BCFA* is a piece of timber inserted into a wall at *AF*. If a weight *P* be appended to the end *B*, what ought to be the form of the under-bounding surface *BCF*, that the strength of the beam may be every where the same; the weight of the beam being supposed to have no effect in producing fracture?



24. $x^3-2x^2+1=0$. Deduce the equation of which the roots are the cubes of the roots of the original equation.

Tuesday Morning Problems.—Mr. Woodhouse.

FIRST AND SECOND CLASSES.

1. The rate of interest being 5 per cent. in what number of years, at compound interest, will £1. amount to £100? (Log. $1050 = 3.021\ 1893$.)

2. Prove, that $\tan. 50 = \tan. 40 + 2. \tan. 10$.

3. Find the algebraic relation between v and z that satisfies this equation

$$\frac{\dot{v}}{\sqrt{(Av^2+Bv+C)}}+\frac{\dot{z}}{\sqrt{(Az^2+Bz+C)}}=0.$$

4. Prove, that

$$\text{h. log. } x = x - x^{-1} - \frac{x^2 - x^{-2}}{2} + \frac{x^3 - x^{-3}}{3} - \&c.$$

5. If $e^y = \frac{e^x+1}{e^x-1}$, find the length of the curve; y and x being its ordinate and abscissa, and e the number whose hyp. log. is 1.

6. Required the time of the passage of a comet from its perihelion, through 45° of anomaly; the perihelion distance being 1.

7. In the 10th section, if the diameter of the wheel be equal to the radius of the globe, the cycloid within the globe, or the *hypocycloid*, becomes a right line passing through the centre. Required proof.

8. Explain the principle and use of the common Vernier or Nonius.

9. Apply the method of increments to sum n terms of the series

$$\frac{1}{1.2.3}+\frac{2^2}{2.3.4}+\frac{3^2}{3.4.5}+\frac{4^2}{4.5.6}+\&c.$$

$$1 + 2.5 + 3.5^2 + 4.5^3 + \&c.$$

10. If the sun's declination on the meridian of Greenwich

were, October 5, $4^\circ. 28'. 36''$,
and, October 6, $4^\circ. 51'. 46''$,

what would be the declination at 2 o'clock, October 5, at any other place 45° west of Greenwich?

11. Prove that the times of moving from the perihelion to the extremity of the latus rectum, in different parabolas, vary in the sesquiplicate ratio of the perihelion distances.

12. If, with a force varying $\frac{1}{(\text{dist.})^2}$, a velocity which is to velocity in circle as $\sqrt{3} : \sqrt{2}$, at an angle θ, and at a distance d, a body be projected; find the excentricity of the orbit described.

13. Let the luminous point be the extremity of the diameter of the circular reflector; find the length of the caustic, its cusp, and the density of rays in its cusp.

Fifth and Sixth Classes.—Mr. Woodhouse.

1. If $\frac{1}{4}$ of a yard cost 9s. 4d. what number of yards will £100. purchase?

2. Solve the equation $1 - \frac{2-x}{x} = \frac{x+2}{2} - 1$,

and of the two expressions $x^3 + y^3$
$x^2y + xy^2$.

Shew which is the greater.

3. With what velocity must a body be projected from a tower, in a direction parallel to the horizon, so that it shall strike the ground at a distance from the foot of the tower, equal half the height of the tower?

4. What is the present value of the compound interest of £100. to be received five years hence?

5. Compare the angular velocity of the earth at its mean distance, with its angular velocity in perihelion.

6. Find the fluxion of $\frac{z}{1+z}$, and the fluent of

$$x^{\frac{3}{5}}\dot{x}\left(1+ax^{\frac{8}{5}}\right)^{-\frac{1}{3}}$$

7. Find the focal length of a spherical drop of water, the radius of which is $\frac{1}{10}$th of an inch.

8. If the periodic time of Mercury be to the periodic time of the earth as 4 : 11, required the time from conjunction to conjunction.

9. In what time will a weight move an equal weight along an inclined plane, the length of the inclined plane being 12 feet, and the height 10 feet?

10. Required the specific gravity of a body that floats in 2 fluids, of which the specific gravities are a and b, when the n^{th} part of the body is in the upper lighter fluid.

11. Given, in a rectilinear triangle, two sides and the included angle; find the third side.

Tuesday Afternoon.—Mr. D'Oyly.

THIRD, FOURTH, FIFTH, AND SIXTH CLASSES.

1. Find the exact value of the circulating decimal .212121 &c.

2. Find a number consisting of 2 places, such, that when it is divided by the difference of its digits, the quotient is 21; and that, when it is divided by the sum of its digits, and the quotient increased by 17, the digits are inverted.

3. The roots of the equation $x^3-14x^2+56x-64=0$ are in geometrical progression. Find them.

4. Given the tangents of two arcs, find the tangents of their sum and difference.

5. Shew, that in a right-angled spherical triangle, if the legs are of the same affection, the hypothenuse is less than a quadrant; and, if the legs are of different affection, the hypothenuse is greater than a quadrant.

6. A body, projected at an angle of 15° to the horizon, ranges 100 feet on an horizontal plane.—How high would it rise, if it were projected straight upwards, with the velocity of projection?

7. The barrel of a condenser, and each barrel of an exhausting air-pump, is $\frac{1}{10}$th of the receiver, and the receiver is equal in both. Let each be worked 3 turns. How much is the density increased in the former, and how much is it diminished in the latter?

8. Prove, that parallax depresses an heavenly body in a vertical circle, and that the parallax at any altitude varies as the sine of the apparent zenith distance.

9. Let a point be taken in the axis of a given ellipse, half-way between its centre and focus. Find the shortest line from this point to the circumference.

10. Prove, that if a body could fall from the surface of the earth to its centre, it would acquire a velocity equal to that with which it would revolve in a circle at the surface; and find the actual velocity.

11. Find the fluents of $\frac{\dot{x}}{1+x^2}$, $x^3\dot{x}\sqrt{1+x^2}$, $\frac{\overline{a^2+x^2}|^{\frac{1}{2}}\dot{x}}{a}$, and $a^x x^2 \dot{x}$.

12. Prove that the mean addititious force in quadrature is to the moon's whole gravitation to the earth, as the square of the moon's periodic time to the square of the earth's periodic time.

13. Compare the side of an equilateral triangle inscribed in a circle with the radius of the circle.

14. Given the sine of 1′; explain how the sines of 2′ 3′, &c. may be found.

15. Solve the quadratic equation $5x=3-2x^2$.

16. Find the 4 roots of the recurring equation $x^4-\frac{5}{2}x^3+2x^2-\frac{5}{2}x+1=0$.

17. Deduce the equation to a parabola, and prove it to be a conic section.

18. A body is projected up an inclined plane, whose height is $\frac{1}{6}$th of its length, with a velocity of 30 feet per second. Find its place, and its velocity after 12 seconds.

19. A cylinder, whose height is 3 times its diameter, is filled with a fluid. Compare the pressure on the sides with the pressure on the base.

20. An object placed 4 inches before a double convex glass lens, has its image formed 9 inches from the lens on the same side. Required the focal length of the lens.

21. Find the attraction of a particle placed in the vertex of a cone, the attraction of each particle being inversely as $\overline{\text{dist.}}|^2$

22. If the force varies inversely as $\overline{\text{dist.}}|^2$, how far must a body fall externally and internally, to acquire the velocity in a circle?

23. Sum series $\frac{1}{2}-\frac{1}{2.3}+\frac{1}{2.3^2}-\frac{1}{2.3^3}+$ &c. ad infin.

$$\frac{1}{2.4.6}+\frac{1}{4.6.8}+\frac{1}{6.8.10} \text{ to } n \text{ terms.}$$

24. Trace Cotes's first spiral; compare the velocity of a body in it with the velocity in a circle, and the time of its falling to the centre with the periodic time in a circle.

Fifth and Sixth Classes.—Mr. D'Oyly.

1. What fraction of half-a-crown is $\frac{1}{7}$ of $\frac{2}{11}$ of a guinea? and what is its exact value?

2. Extract the square root of $2 - 4\sqrt{-2}$.

3. What number is that, the treble of which, added to the double of its square root, is equal to 1.

4. Given the sines and consines of two arcs; find the sine and cosine of their sum and difference.

5. Prove Cardan's rule for solving a cubic equation; and shew that it can only be applied where two roots are impossible.

6. A body is projected up an inclined plane, whose length is 10 times its height, with a velocity of 30 feet in 1″. In what time will its velocity be destroyed?

7. A plane surface moves in a fluid, in a direction perpendicular to its plane, with a certain velocity. Another plane, 4 times as large, moves in a fluid of 3 times the density, and with twice the velocity. Compare the resistances.

8. Given the latitude of the place, and the sun's declination; find the time of its rising.

9. Find the fluxion of $\frac{\overline{a^2 - y^2}\big|^{\frac{1}{2}}}{y^{\frac{1}{2}}}$, and fluents of $\frac{\dot{y}}{1+y}$ and $\frac{2b\dot{x}}{x\sqrt{x^2 - b^2}}$.

10. Deduce the general expression for the centripetal force; and apply it to find the variation of the force in the logarithmic spiral.

11. Sum $\frac{1}{2}-\frac{1}{4}+\frac{1}{8}-\frac{1}{16}+$ &c. to inf.

$1+2+3+4+$ &c. to n terms.

12. Shew, that when the force ∝ dist. all times of descent to the centre are equal; and that the velocity at any point is as the sine of the arch, whose versed sine is space described, the first distance being radius.

Evening Problems.—Mr. D'Oyly.

FIRST, SECOND, THIRD, AND FOURTH CLASSES.

1. Prove the rule for extracting the square root of a binomial surd; and apply it to extract the square root of $1-4\sqrt{-3}$.

2. The sun's declination being 16° N. required the latitude of the place where it rises in the N. E. point, and also the time of its rising.

3. P and Q, each weighing 2 lbs. balance one another over a pulley; 1 oz. is added to P. How far will it have descended in 5″, and what velocity will it have acquired?

4. Compare the density of light in the sun's image, formed by a sphere of water, and by a plano-convex glass lens of twice the aperture and twice the radius, the transmitting powers being supposed the same.

5. Find the fluents of $\frac{dx^2\dot{x}}{\sqrt{1-x^2}}$ of $\frac{\dot{v}}{\overline{a^2+v^2}|^2}$, and of $z^3\dot{y}$, where z is the circular arc, whose sine is y to radius a.

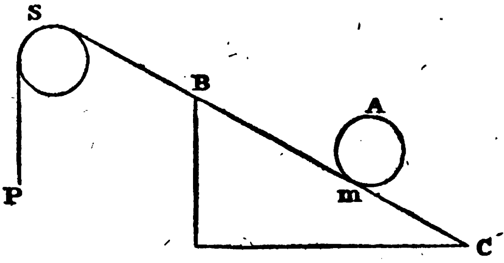
6. A vessel, whose shape is the frustum of a cone of given dimensions, is filled with a fluid, the smaller end being downwards, and is turned round on its axis with such a velocity, that all the fluid flies out. Required the velocity with which it turns round.

7. Approximate to a value of x in $x^3 - x - 50 = 0$; and shew on what the accuracy of an approximation depends.

8. While a body is revolving in a circle $\left(F \propto \frac{1}{D^3}\right)$ the absolute central force is suddenly doubled. Find in what time it will fall to the centre; and, when it has fallen half way, compare its velocity with that in a circle at the same distance.

9. The tangent of the angle, which the hour-lines for 3 and 4 o'clock make with one another on an horizontal dial, is to the tangent of the angle, which the hour-lines for 2 and 3 o'clock make with one another, in the given proportion of m to n. Find the latitude for which the dial is constructed.

10. A sphere A, whose weight is w, is made to roll down an inclined plane BC, by means of a string wrapt round it, which is sustained by P, $P = \frac{w}{10}$. What must be the proportion of the height of the plane to its length, that P may neither ascend nor descend?



11. When parallel rays fall on a spherical refracting surface of given radius, the ratio of the sines of incidence and refraction being known, find the longitudinal and latitudinal aberrations.

12. A curve is described, whose ordinate is the arc of a given circle, and whose abscissa is the corresponding sine. Find its area.

13. A thin rod of given length, weighing 1 lb. is suspended from its upper point, and has a weight $\frac{1}{2}$ lb. attached to it at $\frac{1}{3}$rd of its length from the point of suspension. Compare the time of its oscillation with this weight attached, with the time of its oscillation without it.

14. If the compressive force of the atmosphere varied as the logarithm of the density, and the density varied inversely as the distance, what would be the law of gravity?

15. If z be an arc of a circle to radius 1, shew that $\frac{1}{2}z = \sin. z - \frac{1}{2}\sin. 2z + \frac{1}{3}\sin. 3z -$ &c.

16. Integrate the fluxional equation $3x^2\dot{y} - 3ax\dot{y} = ay\dot{x}$.

17. Prove that

$$a^x = 1 + \frac{A}{m} + \frac{2AX + A^2}{2m^2} + \frac{3AX^2 + 6A^2 + A^3}{6m^3} + \text{\&c.}$$

A and X being logarithms of a and x to modulus m.

18. A and B are playing a set at tennis. A wants two games, and B wants three; but A's skill is to B's in the proportion of 2 to 3. Find their respective chances of winning the set.

19. Find the integral of $\frac{1}{z}$.

20. Trace the curve, whose equation is $\overline{x^2+y^2}\big|^2 = x^2 - y^2$; find the value of x, when the curve is parallel to the axis; and determine the angle at which it cuts the axis, when the value of x is greatest.

21. A body moves in a logarithmic spiral in a resisting medium $\left(\text{density} \propto \frac{1}{\text{dist.}}\right)$ with a force varying as $\frac{1}{\overline{\text{dist.}}|^{\frac{1}{2}}}$. It makes one revolution in t'', and approaches to the centre by 100th part of its first distance. Find the whole time of falling to the centre.

32. Sum series

$$1.4.5+2.5.6+3.6.7+\&c. \text{ to } n \text{ terms;}$$

$$\frac{10}{1.2.4}+\frac{14}{2.3.5}+\frac{18}{3.4.6}+\&c. \text{ to } n \text{ terms;}$$

$$\frac{1}{1.4}-\frac{1}{3.6}+\frac{1}{5.8}-\&c. \text{ to inf.}$$

23. The arch of a bridge being a cycloid, what must be the nature of the curve bounding the wall above, that all the parts of the arch may be in equilibrio?

1809.

First Morning.—Mr. D'Oyly.

MONDAY, JANUARY 16.—*FIRST AND SECOND CLASSES.*

1. Prove that if A and B are two angles, $\frac{\cos. A \times \cos. B}{r} = \frac{1}{2}\cos.(A+B) + \frac{1}{2}\cos.(A-B)$.

2. Find the roots of the equation $x^3 - 6x^2 - 4x + 24 = 0$, which are in arithmetical progression.

3. Given the horizontal parallax of an heavenly body, its right ascension, and declination; Find its parallax in right ascension at a given time in a given latitude.

4. Compare the momentum of a circle revolving on one of its diameters with that of its circumscribing square.

5. Find the point of contrary flexure in a curve, whose equation is $x = \overline{\text{hyp. log.} y}|^3$.

6. A vessel in the shape of an hemisphere is filled with a fluid. Compare the time of its emptying itself through an orifice in its vertex, with the time of emptying through an equal orifice in its base.

7. Shew how the densities of planets may be compared.

8. Find the equation of the curve in which the sub-tangent $= b + y$; b being a constant quantity, and y the ordinate.

9. Find the integral of $\frac{1}{r^2}$.

10. Find the centre of gyration of a spherical superficies revolving on one of its diameters.

11. Prove the sum of the series $1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} +$ &c. continued ad infin. to be infinite.

12. Find fluents of $\frac{\dot{x}}{x^2.(x+a)}$, of $\frac{x^2\dot{x}}{(x-2)(x-3)}$ and of $\frac{x\dot{x}\log.x}{\sqrt{a^2+x^2}}$.

13. There are four individuals, for each of whom the chance of dying in a certain time, is $\frac{1}{10}$. Compare the chance, that two of them at least will be dead in that time, with the chance that exactly two will be dead.

Monday Afternoon.—Mr. Brown.

THIRD AND FOURTH CLASSES.

1. What is the interest of £260. for 18 months, at 4½ per cent?

2. What is the discount of the same sum, for the same time, at the same rate?

3. The arms of a bent lever are in the proportion of 2 : 1. What must be the angle at which they are inclined, that, when in equilibrio, the shorter arm may be parallel to the horizon?

4. Given R and r the radii of the surfaces of a convex lens, and $m:n$ the ratio of the sines of incidence and refraction; Find the focal length, and shew it to be the same, which-ever way the rays come.

5. A pendulum gains n seconds a day. How far must it be elevated above the earth's surface to keep true time?

6. Solve the following equation; $x^3-x^2-8x+12=0$, which has 2 equal roots.

7. Find the respective bearings of London and Constantinople from each other.

8. Compare the velocity of a body at the vertex of a parabola, with the velocity in a circle at the distance of half the latus rectum.

9. Find how far a body must fall externally, to acquire the velocity in an ellipse, when the force tends to the focus.

10. Find the sum of the following series: $\frac{1}{1.3}+\frac{1}{2.4}+\frac{1}{3.5}+$&c. ad inf. and n terms of $1^2+2^2+3^2$ &c. by the method of increments.

11. Find the fluxion of ay^x; and the fluents of $\frac{\dot{x}}{\sqrt{a^2+x^2}}$, and of $\frac{x\dot{x}}{\sqrt{2ax-x^2}}$.

12. Find the area of the common parabola intercepted between the ordinates b and c.

13. Shew, generally, in the conic sections, that $\frac{QT^2}{QR}=L$.

14. A body is projected with a velocity less than that acquired from an infinite distance, the force

varying inversely as the cube of the distance. Investigate the orbit, and find in what time the body will fall into the centre.

Fifth and Sixth Classes.—Mr. D'Oyly.

1. If $2\frac{3}{4}$ yards of cloth cost 3s. $8\frac{1}{4}$d. what will be the price of $7\frac{2}{5}$ yards?

2. Extract the square root of $1+4\sqrt{-3}$; and prove the rule by which it is done.

3. Find the value of x in $3x-\frac{x-4}{4}-4=\frac{5x+14}{3}$.

4. Find two numbers such, that their product may be 24, and the sum of their squares 52.

5. Given the sine of an arc $=s$ to radius 1; express its cosine, versed sine, secant, tangent, and co-tangent.

6. Shew that impossible roots enter an equation by pairs.

7. A body falls 20 feet down an inclined plane, whose height is one-sixth of its length. What is the time of its motion, and what its last acquired velocity?

8. A body is projected at an angle of 45° with a velocity of 50 feet per second. Find its horizontal range.

9. A body weighs 14 lbs. in vacuo, and 9 lbs. in water. Another weighs 8 lbs. in vacuo, and 7 lbs. in water. Compare their specific gravities.

10. A person who can see distinctly at the distance of 3 feet, wishes to see an object at 12 feet distance. What sort of glass must he use, and what must be its focal length.

11. Divide 30 into two such parts, that the square of the one multiplied into the other, may be a maximum.

12. Find fluents of $\overline{a^2+x^2}|^3 \times x\dot{x}$, of $\frac{x\dot{x}}{a^2+x^2}$, and of $\frac{a\dot{x}}{\sqrt{2ax-x^2}}$. Find also the fluxion of $\frac{y}{\sqrt{1+y^2}}$.

13. Sum 50 terms of the arithmetical series $1+3+5+$ &c. Also $\frac{1}{1.2}+\frac{1}{2.3}+\frac{1}{3.4}+$ &c. ad infin.

14. If a body revolves in a circle, how far must it fall externally and internally, to require the velocity in the circle: the force varying inversely as $\overline{\text{dist.}}|^2$?

15. Prove that in any curve, the centrifugal force : centripetal force :: $Sy^2 \times Pv : 2Sp^3$.

16. If the force varies as the distance, shew that the velocity of a falling body is as the sine, and the time as the arc; the versed sine being the space described.

17. Find the diameter of curvature in an ellipse, and the chords of curvature passing through the focus and through the centre.

18. Define the following terms in Astronomy: The right ascension and declination, latitude and longitude of an heavenly body; the true anomaly and mean anomaly of a planet; diurnal parallax and annual parallax; solstitial colure, and equinoxial colure.

Evening Problems.—Mr. Brown.

1. What is the present worth of an annuity of £20. a year, to continue for ever, and to commence after 2 years; the rate of interest being 5 per cent.?

2. How far will the Tychonic system account for the phenomena of the heavenly bodies? What phenomena will it not account for?

3. A pendulum in the latitude of 60° oscillates once in a second, supposing the earth not to revolve round its axis. What must be the angular motion of the earth, that it may oscillate once in 3 seconds?

4. Compare the mean ablatitious force in a whole revolution of the moon with the force of gravity on the earth's surface.

5. Prove, in the latitude of Cambridge, that the diurnal path of a shadow formed on the horizontal plane by the vertex of a gnomon, is convex towards the north during the passage of the sun from the vernal to the autumnal equinox, and convex towards the south during his passage from the autumnal to the vernal equinox.

6. Find the probability of throwing two aces in three trials with a single die.

7. Shew in what position of the eye and object the image formed by a double convex lens will be magnified or diminished; and when it will be erect, and when inverted.

8. Construct the fluent of $\frac{\dot{z}}{1+2az+z^2}$, a being less than 1.

9. Find the time in which a body will describe a given space, when acted upon by a force varying inversely as the distance.

10. Find in MERCATOR'S projection the length of the meridian intercepted between 30° and 60° of latitude.

11. Find the fluents of $\frac{\dot{x}}{\overline{x-a}|^{2}\times\overline{x-b}|}$; and of $\frac{(a+\sqrt{a^2-x^2})\dot{x}}{x}$; of $X^2\dot{x}$ where $X=$hyp. log. of x.

Also of $\frac{\dot{x}}{x^4-2x^3-x^2+2x}$; the roots of the equation tion $x^4-2x^3-x^2+2x=0$ being -1, 0, 1, 2.

12. The radii of a wheel and axle are in the proportion of $a:b$; a weight P, acting by means of a line on the circumference of the wheel, elevates another weight Q, suspended from the line which goes round the axle. Required the pressure on the axis.

13. At a given place, and a given time, find the angle between the ecliptic and horizon, the culminating point, and the height of the nonagesimal degree. When is the angle between the ecliptic and horizon the least?

14. Find the expression for $\overline{\cos. x}|^{n}$ in terms of the cosines of multiples of x.

15. In a given parabola to inscribe another parabola, whose area shall be a maximum; the vertex of the inscribed parabola being in the middle of the base of the other.

16. A given piece of gold is balanced by its weight of brass in vacuo. What addition must be made to the brass, that they may be in equilibrio when immersed in water?

17. Apply TAYLOR'S Theorem to find the sine of an arc in terms of the arc itself.

18. Sum the following series:

$1-\frac{1}{3.3}+\frac{1}{5.3^2}-\frac{1}{7.3^3}+$ &c. ad. inf.

$\frac{1}{1.2.5}-\frac{1}{2.3.7}+\frac{1}{3.4.9}-$ &c. ad inf.

$1^4+2^4+3^4+$ &c. to n terms, by increments.

19. Given the lengths of two degrees in different latitudes; Find the ratio of the polar and equatorial diameters.

20. The sum of the m^{th} powers of the roots of the equation $x^n - 1 = 0$ is n, whenever m is equal to n or to any multiple of n; but in all other cases $= 0$. Required a proof.

21. An iron globe descends in water by the force of gravity; Find the greatest velocity it can acquire, and the time of describing a given space from rest.

22. A stone is whirled round horizontally by a string 2 yards long. What is the time of one revolution, when the tension of the string is 4 times the weight of the stone.

23. Transform the equation $x^n - px^{n-1} + qx^{n-2}$ &c. $= 0$, whose roots are α, β, γ, &c., into one whose roots are $\overline{\alpha-\beta}|^2$, $\overline{\alpha-\gamma}|^2$, $\overline{\beta-\gamma}|^2$, &c.; and shew the use of such a transformation in finding impossible roots.

Tuesday Morning Problems.—Mr. Brown.

1. Find the value of the decimal .346565, &c. in a vulgar fraction.

2. Shew how the latitude and longitude of a star may be found.

3. Two equal weights, P and Q, are connected by a string passing over a fixed pulley; What weight added to P will cause it to acquire in 6 seconds a velocity of 48 feet? and through what space will it have fallen in that time?

4. If $A + B + C = m\pi$, ($m =$ any whole number, $\pi = 180^\circ$); then, tan. $A +$ tan. $B +$ tan. $C =$ tan. $A \times$ tan. $B \times$ tan. C.

5. Find the whole fluent of $\frac{x^m \dot{x}}{\sqrt{a^2 - x^2}}$, when $x = 0$, and m is an even number. Find the fluents of $\frac{\dot{z}}{\sin. z}$, and of $\frac{y^{\frac{1}{2}} \dot{y}}{\sqrt{r^3 - y^3}}$.

6. Find the ratio between the sines of incidence and refraction out of a certain fluid into air; so that the eye, which can just see the extremity of the base of a given cylindrical vessel when empty, may see the centre of the base when it is three parts full.

7. Determine the ratio of the diameter and altitude of a cylindrical vessel open at the top, which shall contain a given quantity under the least possible internal superficies.

8. Find the expression for the proportion between the centripetal and centrifugal forces in any curve; and apply it to the reciprocal spiral.

9. Find the sum of the first n terms of $\frac{1}{1.2.4} + \frac{1}{2.3.5} + \frac{1}{3.4.6}$, by increments; and of $\frac{1}{1^2} + \frac{1}{2^2} + \frac{1}{3^2}$, &c. ad inf.

10. Find the increment of the moon's velocity by the tangential force, while she moves from quadrature to syzygy.

11. Shew that, if the resistance in any medium be proportional to the velocity, the oscillations in a cycloid will be isochronous.

12. If a be root of the equation, $x^n - px^{n-1} + qx^{n-2} + \&c. \ldots\ldots \pm w = 0$; shew that the equation is divisible by $x - a$, without considering it as composed of the factors $\overline{x - a} . \overline{x - b}$. &c.

13. Suppose a cylindrical rod, whose length *(l)* and weight *(w)* are given, to be suspended at a distance *(d)* from one of its ends. If a weight *(a)* be attached to the lower end, what weight must be attached to the upper, that the time of oscillation may be the same as before?

Third and Fourth Classes.—Mr. D'Oyly.

1. Find two values of x in the equation $x+\frac{24}{x-1}=3x-4$.

2. Given the three sides of a plane triangle; Explain how the three angles may be found.

3. Divide the number 100 into two such parts, that the square of the one multiplied into the square root of the other, may be a maximum.

4. Find between which of the roots of the equation $x^3-7x^2+7x+10=0$, the number 3 lies.

5. A stone projected at an angle of 30° strikes the horizontal plane at the distance of 50 yards. With what velocity was it projected?

6. A pendulum vibrates 61 times in a minute. How must its length be altered, so that it may vibrate 60 times in a minute?

7. In the tube of a barometer 36 inches long, the mercury stands at $29\frac{1}{2}$ inches, when the standard altitude is 30 inches. How much air was left in at the time of inversion?

8. Find the principal focus of a given glass globe.

9. Find the area of the curve, in which the subtangent $=\frac{b}{1+y^2}$; y being the ordinate, and b a constant quantity.

10. Find fluents of $\frac{x^3 \dot{x}}{x-a}$, of $y^2 \dot{y} \sqrt{a^2 - y^2}$, and of $a^x x \dot{x}$.

11. Explain the method of finding the hour of the the day by observing the sun's altitude; the latitude of the place, and the sun's declination, being known.

12. If a hole were bored from the surface of the earth to its centre, what would be the velocity acquired at the centre, by a body which fell from the height of 1 radius above its surface; the force above the surface being inversely as $\overline{\text{dist.}}|^2$, and below the surface being directly as dist.?

13. Having given the major and minor axis of an ellipse, and the force in the focus; Compare the periodic time in the ellipse with the periodic time in a circle, whose radius = greatest distance in the ellipse.

Fifth and Sixth Classes.—Mr. Brown.

1. Find the value of the decimal .124343 &c. in a vulgar fraction.

2. If $\frac{3}{4}$ of a yard of cloth cost $\frac{1}{4}$£., what will $12\frac{2}{3}$ yards cost?

3. At what time are the hour and minute-hands of a watch together between 2 and 3 o'clock?

4. Find the length of the cycloid.

5. Given $\left\{\begin{matrix} x^3 + y^3 = 72 \\ x + y = 6 \end{matrix}\right\}$ to find x and y.

6. Given the latitude of the place, and the sun's meridian altitude; to find the sun's declination.

7. Shew, that the velocity in a parabola is to the velocity in a circle at the same distance as $\sqrt{2} : 1$.

8. Sum the series:

$$\frac{1}{3}-\frac{1}{6}+\frac{1}{12}-\frac{1}{24}+\text{\&c. ad inf.}$$

$$\frac{1}{1.2.3}+\frac{1}{2.3.4}+\frac{1}{3.4.5}+\text{\&c. ad inf.}$$

9. Two columns of water and mercury communicate at the bottom of a bended tube. If the altitude of the mercury be 10 inches, what is the altitude of the water, supposing the ratio of their specific gravities to be 14 : 1?

10. What is the length of the longest day in latitude 45°?

11. Given the tangents of two arcs, to find the tangents of their sum and difference.

12. When the force varies inversely as the square of the distance, compare the velocity acquired through any space with the velocity in a circle at the same distance.

14. Shew, that the velocity in any curve, is equal to that which would be acquired with the same force continued uniform, through $\frac{1}{4}$ chord of curvature.

13. Find the field of view, and magnifying power, of the Astronomical telescope.

14. Find the fluxion of $\frac{\overline{a^4+x^4}|^{\frac{1}{2}}}{x}$, and the fluent of $\frac{2a\dot{x}}{a^2+x^2}$.

16. Inscribe the greatest parallelogram in a given semi-circle.

Evening Problems.—Mr. D'Oyly.

1. Find the hyperbolic logarithm of 3, by applying Cotes's series for the hyp. log. $\frac{z+x}{z-x}$ to 3 terms.

2. Find an arc, which has the rectangle under its chord and cosine a maximum.

3. Approximate to a value of x in $x^3+2x-30=0$.

4. An object placed 4 inches before a double convex lens, has its image erect with respect to itself, and of three times its linear magnitude.—Required the focal length of the lens.

5. A body is projected at an angle of 60° to the horizon, with a velocity of 100 feet per second. What will be its time of flight before it strikes a plane inclined to the horizon at an angle of 30°? and what will be its greatest elevation above that plane?

6. Investigate Sir I. NEWTON'S rule for detecting impossible roots in an equation, and apply it to the equation $x^6+3x^4-4x^2-12=0$.

7. If a quadrantal arc is divided into any 3 parts, the sum of the products of the tangents of these parts taken two together, is equal to the square of the radius. Required proof.

8. The right ascensions and declinations of two stars being known, the time is observed when they come to the same azimuth. Shew how the latitude of the place may from hence be found.

9. Prove that the portion of the earth's surface included between the two circles of latitude 30° on each side of the equator, is half its whole surface; the earth being supposed to be a perfect sphere.

10. Find fluents of $\frac{x^6\dot{x}}{x^2+a^2}$ of $\frac{\dot{x}}{x^5\sqrt{x^2+a^2}}$, and of $\frac{\dot{z}}{\sin. z \cos. z}$.

11. A chain of uniform thickness, hanging freely, forms itself into a cubical parabola. Required the law of its density and weight.

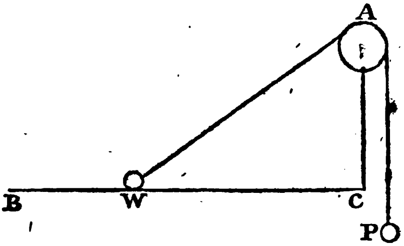
12. Let a plane circle oscillate on an axis, which passes perpendicular to its plane at the distance of half the radius from its centre. At what other distance may the axis pass, so that the oscillation may be performed in the same time?

13. If a body revolve in an ellipse round the focus, required the point at which the angular velocity of the perpendicular on the tangent is the least possible.

14. If a body is revolving in a circle $\left(F \propto \frac{1}{D^3}\right)$, and half the central force is suddenly taken away; after what revolution will it fly off to an infinite distance?

15. The node of the moon's orbit being distant 30° from syzygy, the part of the ablatitious force, which acts perpendicular to the plane of the orbit, is found to be $\frac{1}{4}$th of its greatest value. What is the moon's place?

16. Let *P* and *W* be two bodies connected by a string passing over the pulley *A*; *P* hanging freely,



and *W* being sustained on an horizontal plane. What velocity will be acquired by *W*, while it is drawn by *P* through the given space *BC*.

17. Integrate the fluxional equation $a\dot{x} = \frac{xy\ddot{y} + x\dot{y}^2}{\dot{x}}$.

18. A given parabola is placed with its plane and axis perpendicular to the horizon, and its vertex downwards. From what point of its highest ordinate must an elastic body be let fall, so that after impinging once on the curve, it may strike the vertex?

19. Find the increment of $z \times \log. z$.

20. Let a system of bodies be moveable round a vertical axis. At what distance from this axis must a given force act, so that the angular velocity communicated to the system in a given time, may be the greatest possible?

21. A person is throwing with two dice. What is the chance of his throwing size-ace, at least once in four trials?

22. Sum n terms of the series $1.2.5 + 2.3.6 + 3.4.7 + \&c.$

Also n terms of $\frac{2}{1.3.4.} + \frac{3}{2.4.5.} + \frac{4}{3.5.6} + \&c.$

And $\frac{1}{1.5} - \frac{1}{3.7} + \frac{1}{5.9} - \frac{1}{7.11} + \&c.$ ad infin.

23. Given the place of a luminary, and a situation on the earth's surface; Find how much the superior tide exceeds the inferior in duration.

24. A beam of given length, having its perpendicular section every where a given parabola, projects horizontally from a wall. Compare its strength to support a weight at its end, when the vertex of the parabola is downwards, with its strength, when the vertex is upwards; the weight of the beam itself not being considered.

1810.

First Morning.—Mr. Walter.

MONDAY, JANUARY 15.—*FIRST AND SECOND CLASSES.*

1. Prove the rule for the multiplication of decimals.

2. What number of degrees, minutes, &c. in the English scale corresponds to 32°. 15′. 25″. in the French scale of 400° in one circumference, 100 minutes in a degree, and 100 seconds in one minute?

3. The quantities of air expelled, by successive turns, from the receiver of an air-pump, decrease in geometrical progression.

4. Given the distance of a planet from each of two stars, whose right ascension and declination are known. Find the right ascension and declination of the planet.

5. If any odd multiple of a quadrant be divided into any three parts, the sum of the co-tangents of the three parts will equal their product.

6. If from a given point a straight line be drawn touching a circle given in position; the straight line is given in position and magnitude.

7. Prove that the sub-contrary section of an oblique cone is a circle.

8. On the axis of a given cycloid, ordinates are drawn equal to the corresponding arcs of the cycloid: find the nature of the curve passing through the extremities of these ordinates, and its area.

9. The aspect of a wall is due south, and the sun is in the south-east with an altitude of 30°. It is required to find the breadth of the shadow cast by the wall.

10. Find the sum of the series $\frac{a}{c}+\frac{a+b}{ce}+\frac{a+2b}{ce^2}+\frac{a+3b}{ce^3}+$ &c. ad inf.

11. Given the capacity of the recess containing compressed air, the space which that air would occupy in its natural state, the diameter and weight of the ball, and the length of the barrel of an air-gun: find the velocity with which the ball leaves the gun, and the time of describing the barrel.

12. If a body be projected from an apse with the velocity acquired in falling from an infinite distance, find after how many revolutions it will fall to the centre when the force varies in a higher ratio than the inverse cube of the distance.

13. Shew that the series sin. $A+$sin. $(A+B)+$ sin. $(A+2B)+$ &c. is a recurring series; and find the scale of relation.

14. A body being projected along any curve, and acted on by gravity, it is required to find an equation for determining the point where it will leave the curve.

Third and Fourth Classes.—Mr. Turton.

1. If $1\frac{1}{8}$th ell English cost $\frac{5}{6}$ths of a guinea, what will $2\frac{1}{3}$d ells Flemish cost; a Flemish ell being $\frac{3}{5}$ths of an English ell.

2. If an angle of a triangle = 120°, shew that the square of the side subtending that angle is equal to the squares of the sides containing it, together with the rectangle contained by those sides.

3. Of two rays passing through a spherical refracting medium, shew that the deviation of the more remote from the centre is greater than that of the less remote.

4. Find at what distance from a given sphere an eye must be placed so as to see an nth part of its surface.

5. The plane of a cycloid, whose axis $= a$, is inclined to the horizon at an angle of 60°. Find the time of descent down a chord drawn from the vertex to the extremity of the base.

6. Prove that in all the conic sections the chord of curvature through the focus $= L \times \frac{SP^2}{SY^2}$, and the diameter of curvature $= L \times \frac{SP^3}{SY^3}$; where L is the principal latus rectum, SP the focal distance, and SY the perpendicular on the tangent.

7. If the force vary directly as the distance from the centre, shew that the velocity of a falling body is to that in a circle at the same distance as the right sine to the cosine of a circular arc, whose radius is the greatest distance and versed sine the space fallen through.

8. Construct Galileo's Telescope; investigate its magnifying power, and find the linear magnitude of the greatest field of view.

9. Find the fluent of $\frac{dx^{3n-1}\dot{x}}{\sqrt{a^n - x^n}}$, and of $\frac{dx^{3n-1}\dot{x}}{a^n - x^n}$.

10. Find the roots of the equation $x^4+3x^3-7x^2-27x-18=0$, two of which are of the form $+a, -a$.

11. If a body fall through a finite altitude AS, the force varying inversely as the square of the distance, and on AS a semi-circle ADS be described; prove that the area described by the variable radius SD is equal to the area uniformly described in the same time in a circle whose radius is the half of SA.

12. Through what space must a body fall internally to acquire the velocity in a circle, the force varying inversely as the distance.

13. Given the sun's meridian altitude, and his midnight depression below the horizon: find the latitude of the place, and the sun's declination.

14. Given the major and minor axis of an ellipse, and the force in the focus. Compare the time in which a body would fall from the farther apside to the focus with the periodic time in the ellipse.

15. Prove that, in different circles, round different centres, when the forces vary inversely as the squares of the distances, the periodic times will vary in the sesquiplicate ratio of the radii directly, and the subduplicate ratio of the absolute forces inversely.

16. If the forces of attraction to each point of a spherical superficies vary inversely as the square of the distance, the attraction of the convex and concave part, on a *corpuscle* placed without it, will be equal.

Fifth and Sixth Classes.—Mr. Walter.

1. Required the value of 2710 lbs. at 6s. 8d. per lb.

2. Required the interest of £547. 15s. at 3 per cent. simple interest, for three years.

3. A certain number, consisting of two figures, gives, when divided by the figure on the right, a quotient equal to 27, and remainder 2; but, if divided by 9, it gives a quotient equal to three times the figure on the right, and a remainder 2. Find the number.

4. Find the value of x in $\sqrt{x}-4=\frac{259-10x}{4+\sqrt{x}}$.

5. Prove, that if $A \propto B$, and $C \propto D$; then $AC \propto BD$.

6. Compare P and W, when they are in equilibrio on a plane whose inclination is 30°, the power being supposed to act parallel to the base of the plane.

7. One body remains at rest in the circumference of a circle, whilst another describes that circumference. It is required to ascertain the curve described by their common centre of gravity.

8. Bisect a given semi-cycloidal arc.

9. Prove, that the horizontal range of a body, projected in the direction AI, is equal to $\frac{\sin. 2\angle IAC \times P}{2 . \text{rad}}$; and prove $\sin. 2. \angle IAC = \sin. 2\angle EAC$.

10. Solve the equation $x^3-5x^2-8x+48=0$; two of whose roots are equal.

11. Sum the series $1+\frac{1}{3}+\frac{1}{9}+$&c. ad inf.;

and $1-2+4-8+$&c. to n terms.

12. Compare the pressure on the base of a cube, filled with water, with the pressure on the four sides.

13. $QC : qC :: \sin. R : \sin. I$, when diverging rays are incident on a plane refracting surface.

14. Given the altitude of a known star, when it is on the prime vertical; find the latitude of the place.

15. Find the fluxion of $\frac{x}{\sqrt{a^3+x^3}}$; also the fluent of $\frac{a\dot{y}}{\sqrt{a^2-y^2}}$.

16. Prove, that the velocity of the earth continually increases from the aphelion to the perihelion distance.

17. Compare the velocity in an ellipse, at the greatest distance, with the velocity of a body revolving in a circle at the same distance.

Evening Problems.—Mr. Turton.

1. Explain the nature of the stereographic projection of the sphere: and shew that angles on the plane of projection are equal to the original angles on the surface of the sphere.

2. Prove, by means of Newton's fourth Lemma, that the area of the common parabola is equal to two-thirds of its circumscribing rectangle.

3. Having given a rectangular piece of metal of uniform thickness, it is required, from one of its angles, to draw a line cutting off a triangle, in such a manner, that, the remaining trapezium being suspended by the obtuse angle, the parallel sides of the trapezium may remain horizontal.

4. It is observed, that two stars, whose right ascensions and declinations are known, pass the prime vertical at the same instant. Required the latitude of the place of observation.

5. Given the latitude of the place, and the sun's declination: find at what time of the day the azimuth of the sun increases the slowest.

6. Investigate, as Cotes has done, the variation of the density of the atmosphere, supposing the force of gravity to vary inversely as the square of the distance from the earth's centre.

7. One root of the equation $x^3 - 4x^2 - 3x + 12 = 0$, is of the form $\sqrt{a}$, where a is not a square number. Solve the equation.

8. A given paraboloid is perforated by a cylinder whose axis coincides with that of the solid. Required the dimensions of the cylinder, so that the part taken away may be equal to that which remains.

9. In a combination of wheels and axles, in which the circumference of each axle is applied to the circumference of the next wheel, and in which the ratios of the radii of the wheels and axles are those of 2 : 1, 4 : 1, 8 : 1, &c. there is an equilibrium when the power : the weight :: 1 : p. Required the the number of wheels.

10. If the roots of the equation $x^n - px^{n-1} + qx^{n-2} - \&c. = 0$, be in arithmetic progression, the least root will be $\frac{p}{n} - \frac{n-1}{n} \times \sqrt{\frac{\overline{n-1}.3p^2 - 6nq}{n^2-1}}$, and the common difference $\frac{2}{n} \times \sqrt{\frac{\overline{n-1}.3p^2 - 6nq}{n^2-1}}$. Required the investigation.

11. Given the major and minor axes of an ellipse. Required the radius of a circle described round the focus as a centre, in which the periodic time is equal to the time of moving through the aphelion, from mean distance to mean distance.

12. Construct Newton's telescope, and investigate its magnifying power.

13. Compare the quantity of water discharged by two equal parabolas in the side of a reservoir kept constantly full; one of the parabolas having its base, and the other its vertex downwards, and the summits of both coinciding with the surface of the fluid.

14. Suppose that a body falls from a given altitude to a centre of which the attractive force varies as the distance, and that the system moves in a direction perpendicular to the line of descent, with a velocity equal to the greatest velocity which the body could acquire in its fall; construct the curve traced out by the body, and then find its area.

15. If z be an integral increasing or decreasing unequally; then $\frac{1}{z_m} = \frac{1}{z} - \frac{\dot{z}}{zz_1} - \frac{\dot{z}+\ddot{z}}{z_1 z_2} - \frac{\dot{z}+2\ddot{z}+\dddot{z}}{z_2 z_3} -$ &c. continued to $m+1$ terms.

16. Find the fluents of the following quantities: viz. $\frac{d\dot{x}}{x^3\sqrt{a^2+x^2}}$; $\frac{x^2\dot{x}}{(x-a)(x-b)(x-c)}$; $\overline{a^2+x^2}|^m \times \dot{x}$, when the fluent of $\overline{a^2+x^2}|^{m+r} \times \dot{x} = A$; $z^n\dot{y}$, where z is a circular arc, and y its sine to radius 1.

17. Sum the following series:

$\frac{1}{1.4.7} + \frac{1}{4.7.10} + \frac{1}{7.10.13} +$ &c. ad infin.

$2^2 + 5^2 + 8^2 +$ &c. to n terms.

$\frac{1}{1.2} + \frac{1}{5.6} + \frac{1}{9.10} +$ &c. ad infin.

$\frac{2}{1.3.3} + \frac{3}{3.5.3^2} + \frac{4}{5.7.3^3} +$ &c. to n terms.

18. Materials are to be raised, through a given altitude, by a wheel and axle whose radii are known; the power, which is given, being applied to the circumference of the wheel. Find the quantity raised at each ascent when the greatest quantity in the whole is raised in a given time; the inertia of the machine being neglected.

19. Find the area on the plane of the horizon that is bounded by the shadow of a tower of given altitude, between the hours of 8 and 2, in a given latitude: the sun being in the equinoctial.

20. Find the relation of x to y in the equation $\dot{x}(a+bx+cy)=\dot{y}(d+ex+fy)$.

21. Let a sphere of given diameter be projected in a fluid whose specific gravity is to that of the body as 1 to n: Having given the velocity of projection, it is required to find the velocity after describing any space and also the time of describing it.

22. Prove that the projection of the rhumb-line, on the plane of the equinoctial to an eye situated in the pole, is a logarithmic spiral; and hence determine the length of any arc of the meridian, on the planisphere.

23. Determine, as Newton has done, the path of a projectile in a medium in which the resistance varies as the velocity; the force of gravity being uniform and acting in parallel lines.

24. Determine the dimensions of a conic frustum, of given altitude, on which, when moving in a resisting medium, in the direction of its axis, with its less end foremost, the resistance will be equal to that on the base of a given cylinder, moving with the same velocity; and at the same time, less than the

resistance on any other frustum of the same base and altitude.

Morning Problems.—Mr. Turton.

1. Define similar curves when referred to their axes; and prove that similar and conterminous arcs have a common tangent at the common point of termination.

2. If (a) and (b) be two sides of a trapezium that are parallel to each other; prove that the centre of gravity of the figure will divide a perpendicular to those sides into two parts that are to each other as $2a+b$ to $2b+a$.

3. If a body fall from a finite altitude towards a centre of force, and the time of falling vary as the nth power of the space fallen through; required the law of the variation of the force.

4. Resolve $\frac{1}{1-x^n}$ into trinomial fractions without the aid of fluxions; n being an even number.

5. If the refracting curve be the logarithmic spiral, and rays issue from the centre, investigate the nature of the caustic.

6. Find the force of elasticity, so that, in the case of direct impact, the sum of the products of each body into the *cube* of its velocity may be the same before and after impact.

7. If a weight P be suspended by an inflexible line, whose length is (a), to what point must a given weight p be attached, so that the pendulum may oscillate in the least time possible?

8. There is a small aperture, whose area is (m) at a given distance (a) from the bottom of a vertical

cylinder filled with water. When full, the fluid falls on the horizontal plane, at the distance (b) from the base; and after (t) seconds at the distance (c) from the base. Required the content of the vessel.

9. Let $y = A + Bx^m + Cx^n + Dx^p + \&c.$ where A, B, C, &c. are constant quantities: then if $\underset{\cdot}{x}$ be given, $\underset{\cdot}{y} = \frac{\dot{y}}{\dot{x}} \times \underset{\cdot}{x} + \frac{\ddot{y}}{1.2.\dot{x}^2} \times \underset{\cdot}{x}^2 + \frac{\dddot{y}}{1.2.3.\dot{x}^3} \times \underset{\cdot}{x}^3 + \&c.$ Required the investigation.

10. Find the fluent of $\frac{dz^{pn+\frac{1}{2}n-1}\dot{z}}{a+bz^n}$; and also of $\frac{dz^{\frac{1}{2}n-1}\dot{z}}{\sqrt{a+bz^n}}$.

11. Find the amount of £1. for the time (t), at compound interest at a given rate; interest being due every moment.

12. In a given latitude, at a given hour, and on a given day, the altitude and azimuth of a star are observed. Required its right ascension and declination.

13. Suppose the earth a perfect sphere, and that a pendulum whose length is (a) inches, vibrates seconds in latitude 60°. What will be the length of a pendulum that vibrates seconds at the equator?

14. Deduce Cotes's construction of his first spiral, by means of Newton's general proposition in the 8th section.

Tuesday Afternoon.—Mr. Walter.

THIRD AND FOURTH CLASSES.

1. How much ready money can I receive for a note of £75. due 15 months hence, at 5 per cent. discount.

2. Find the values of x and y, when $xy=63$, and $\overline{x+y}\rvert^2 :: \overline{x-y}\rvert^2 : 64 : 1$. Also value of x in this equation $x^2.\overline{x+4}+2x.\overline{x+4}=2-\overline{x+4}$.

3. Divide a given angle into two angles, such that their sines may be in a given ratio.

4. Express the side of a regular decagon, inscribed in a circle, in terms of the radius.

5. Two bodies, A and B, are projected perpendicularly upward with velocities (a) and (b). It is required to assign the highest point to which their common centre of gravity will ascend.

6. Find the roots of the equation $x^3-13x^2+50x-56=0$, two of whose roots are in the ratio of 2 : 1.

7. The diameter of a cylinder is 10 inches, and the diameter of an orifice in its base .025; also the height of the water in the cylinder is $8\frac{1}{24}$ feet. Required the time of emptying.

8. Given the apparent perpendicular depth of an object under the water, to find the direction in which a ball must be fired from a given point, so as to strike the object.

9. Sum the series $3+\frac{1}{2}+\frac{1}{12}+$ &c. *ad infinitum.*

Also, $1.3.5+3.5.7+5.7.9+$ &c. to n terms.

10. Determine the equation of a curve by whose revolution a solid is generated equal, at all altitudes, to $\frac{3}{5}$ths of its circumscribing cylinder.

11. Find the centre of gravity of a bar whose density $\propto x^n$; x being the distance from the vertex.

12 A known star rises in the north-east point; find from this circumstance the latitude of the place.

13. Prove that V^2 in any curve : v^2 in a circle at the same distance :: $\frac{\dot{y}}{y} : \frac{\dot{p}}{p}$, where y is the variable distance, and p the perpendicular on the tangent.

14. How does the centrifugal force vary in different curves? and how does it vary in different parts of the same curve?

Fifth and Sixth Classes.—Mr. Turton.

1. If $\frac{4}{5}$ yards cost £$2\frac{1}{4}$, find the value of $5\frac{7}{8}$ yards both by vulgar fractions and by decimals.

2. Prove that if a straight line stand at right angles to each of two straight lines in the point of their intersection, it will be at right angles to the plane that passes through them.

3. Define a rhombus; and prove that the diagonals of a rhombus bisect each other at right angles.

4. If (a) be the first term, and (b) the sum of three terms of a geometric progression, find the common ratio.

5. If the fluxion of $\frac{\sqrt{ax} - b}{\sqrt{a-x}} = 0$, find the value of x.

6. Given three bodies A, B, C, and their distances from a plane; find the distance of their common centre of gravity from that plane, supposing A and B to be on one side of the plane, and C on the other side.

7. Given the velocity and direction of projection, find the greatest height of the projectile above the inclined plane; and from the expression deduce the greatest height above the horizontal plane.

8. Shew that if a plane mirror recede from a fixed object, the image will recede twice as fast.

9. Explain the principle on which the Hydrometer is constructed, and demonstrate the proposition on which the construction depends.

10. Construct the common Astronomical Telescope, and investigate its magnifying power.

11. Given the latitude of the place, and the sun's declination; to find his azimuth at six o'clock.

12. Shew that the velocity in any conic section is to the velocity in a circle at the same distance in the subduplicate ratio of $\frac{1}{2}L \times SP$ to SY^2.

12. Find the fluents of the following quantities: viz. $\frac{d\dot{z}}{\overline{a+bz}\rvert^{\frac{m}{n}}}$; $\frac{x^5\dot{x}}{a^2-x^2}$; and $\overline{a^2+x^2}\rvert^{m} \times x^2\dot{x}$.

14. Sum the series $\frac{1}{1.2.3} + \frac{1}{2.3.4} + \frac{1}{3.4.5} + \&c.$ to n terms, and *ad infinitum.*

15. Investigate the assumptions by which an equation $(x^n - px^{n-1} + qx^{n-2} - \&c. = 0)$ may be transformed into others wanting the second or third terms.

16. Given the earth's radius and the space fallen through in one second at its surface, find the periodic time in a circle at a given distance above the earth's surface; gravity varying inversely as the square of the distance.

17. If a body whose elasticity is to perfect elasticity as m to 1 be let fall from a given altitude (a) above a perfectly hard horizontal plane, and rebound continually till its whole velocity is destroyed; find the whole space described.

18. A given paraboloid floats in a fluid with its vertex downwards; compare the specific gravities of the body and the fluid, supposing half the axis to be immersed.

Evening Problems.—Mr. Walter.

1. A cylindrical bar is suspended by a given point in a semi-circle, whose diameter is the bar. Find the inclination of the bar to the horizon, upon supposition that the semi-circle is devoid of weight.

2. Prove, from a property of the circle, that if four quantities are proportionals, the sum of the greatest and least is greater than the sum of the other two.

3. Given the area of any plane surface, it is required to find the content of a solid, formed by drawing lines from a given point without the plane, to every part of its surface.

4. The inclination of a perfectly smooth bank to the horizon is 30°, and a body is projected up the bank in a direction making an angle of 45°, with the intersection of the bank and horizontal plane. It is required to determine the curve described by the body, and the spot where it will again meet the horizon.

5. If two curves have a common axis, and ordinates which are always in a given ratio to each other, then tangents drawn from the extremities of any corresponding ordinates will meet the axis in the same point.

6. The direction of a bridge is from east to west, and the sun in the meridian. The arches being supposed semi-circular, it is required to find the curve

terminating that part of the surface of the water which is illuminated by the sun's rays passing through any arch.

7. It is required to express the cosine of an angle of a spherical triangle in terms of the sines and cosines of the sides.

8. If a body revolves in any curve whose equation is $ap = y^n$, y being the distance from the centre of force, and y the perpendicular on the tangent; it is required to find the equation of the curve of a star's apparent aberration, as seen from this body.

9. The roots of the equation $x^3 - px^2 + qx - r = 0$, are a, b, c,; transform it into one whose roots shall be $\overline{a+b}$, $\overline{b+c}$, $\overline{a+c}$.

10. Required the position of the eye in a given line perpendicular to the horizon, so that the image of a given circle on the ground may also be a circle, when projected on a plane perpendicular to the horizon by lines drawn to the eye.

11. Find by the help of the common tables the logarithm of a number consisting of seven figures.

12. The roots of the equation $x^3 - px^2 + qx - r = 0$, are in harmonical progression: find them.

13. Given the sun's declination, and the latitude of the place; find the path described by the shadow of a staff on an horizontal plane.

14. Sum the series $1.2.4 + 3.4.6 + 5.6.8 +$ &c. to n terms.

Also $\frac{1}{3} - \frac{2}{4} + \frac{3}{5} - \frac{4}{6}$&c. to infinity.

And $\frac{1}{1.3} + \frac{1}{2.4} + \frac{1}{3.5} +$ &c. to n terms, and to infinity.

15. A has (p) counters, and B has (q); also the

chance of *A's* winning a single counter from *B* is to the chance of *B's* getting one from *A* :: *a* : *b*. What is the probability that *A* will win all *B's* counters?

16. Explain the method of finding the velocity with which a bullet struck a pendulous body.

17. If a ponderous cylinder is put in motion about its axis by a weight p, descending through a space s; and, p being taken off, the moment thus generated be employed to elevate another weight q: the space through which the cylinder's motion elevates q can never be so great as $s \times \frac{p}{q}$, even if the effects of friction are neglected.

18. Find the fluent of $v^m x^n \dot{x}$, when v is the hyp. log. of $\frac{1}{x^2}$. Also the fluent of $\frac{x^2 \dot{x}}{x^2 - 3x + 2}$.

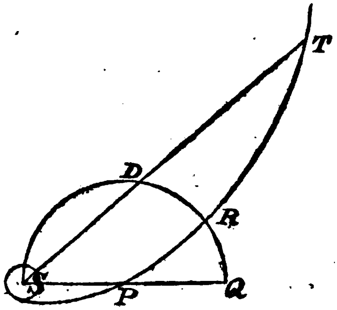
18. Find the relation of x and y, when $\frac{p\dot{x}}{x} + \frac{r\dot{y}}{y} = \frac{x^m \dot{x}}{ay^n}$, and also when $ay + \frac{b\dot{y}}{\dot{x}} + \frac{c\ddot{y}}{\dot{x}^2} = 0$.

20. Having given the velocity of projection, greater than that acquired by falling from an infinite distance, when the force $\propto \frac{1}{D^3}$, and also the distance from the centre of force; find the proper direction of projection so that any one of Cotes's three last spirals may be described.

21. Having given the fluents of $y\dot{x}$, $yx\dot{x}$, $yx^2\dot{x}$, $\ldots\ldots yx^{n-1}\dot{x}$; find the fluents of $\dot{A} = y\dot{x}$, $\dot{B} = A\dot{x}$, $\dot{C} = B\dot{x} \ldots\ldots\ldots \dot{R} = Q\dot{x}$, the number of the last equations being n.

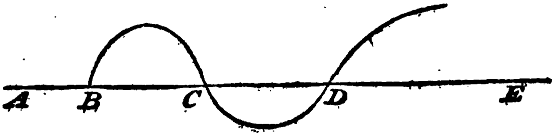
22. *S* is the pole of the logarithmic spiral, and *P* any point in the curve; if with centre *P*, and radius

PS, a circle be described, and *QD* taken equal to *n* times *QR*, then *DT* may be expressed by a series of cosines of *RQ* and its multiples, the variable coefficients of the series being those of $\overline{a+x}|^n$



23. Suppose both sun and moon in the equator, and prove that the momentary change in the height of the whole tide is proportional to the sine of twice the moon's distance from the place of high water.

24. Let $y=ax^n+bx^{n-1}+cx^{n-2}+$ &c. be the equation to the parabolic curve whose axis is *AE*. Prove that the continued product of the greatest ordinates will be equal to $\frac{a^{n-1}}{n^n}$ multiplied into $BC^2 \times BD^2 \times CD^2 \times$ &c.



FINIS.

ERRATA.

P. 23. l. 18. for *a body*, read, *a falling body*.

P. 30. l. 4. read, the equation $a^2y-x^2y-a^3=0$.

P. 84. l. 17. for *vertices*, read *vortices*.

P. 108. l. 2. for *field view*, read *field of view*.

P. 113. l. 9. for *x cosec. p. sec. l.* read ×*cosec. p. sec. l*,

P. 142. l. 11. for *consines*, read *cosines*.

HODSON, PRINTER, CAMBRIDGE.

The Gift of Mr Allston Gibbs
Tutor in Harvard University
18[illegible]- 1818

THE
LITERARY AND SCIENTIFIC
PURSUITS
WHICH ARE ENCOURAGED AND ENFORCED
IN THE
University of Cambridge,

BRIEFLY DESCRIBED AND VINDICATED.

WITH VARIOUS NOTES.

BY THE

Rev. LATHAM WAINEWRIGHT, A.M. F.A.S.

OF EMMANUEL COLLEGE, IN THAT UNIVERSITY;
AND
RECTOR OF GREAT BRICKHILL, BUCKS.

> Πολλὸν δ' ἰφθίμοισι δεδώρηται βασιλεῦσι,
> Πολλὸν δὲ πτολίεσσι, πολυν δ' ἀγαθοῖσιν ἑταίροις.
>
> Theoc. Idyll. 17.

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TO THE

RIGHT HONOURABLE

LORD VISCOUNT PALMERSTON,

SECRETARY AT WAR,

AND

M. P. FOR THE UNIVERSITY OF CAMBRIDGE.

◆

MY LORD,

The following statement and observations are intended, in some measure, to supply a desideratum which has long been felt by many intelligent persons, desirous of forming an impartial estimate of the merits of those ancient foundations which have been so frequently aspersed by prejudice and calumny. It is somewhat a singular circumstance, that while so many of the higher and middle classes of society resort to Cambridge for the completion of their education, there should exist no description of its studies and pursuits, claiming confidence by its authority, and at the same time adapted to the purpose of general readers, though the subject is, beyond doubt, closely allied to the best interests of the community. A publication, therefore, which professes to afford some remedy for the want of authorized information respecting this University, cannot be better recommended to the attention of the public, than under the sanction of Your Lordship's name.—While it becomes us to rectify the errors of those who gratefully acknowledge the singular advantages resulting from our civil and ecclesiastical establishments, it is equally expedient that we should endeavour to counteract the mis-statements and false accusations of men, who are not only uniformly hostile to all that wears the venerable form of antiquity, but who, in their incoherent projects of reformation, would reduce the attainments of every order of the State, however elevated by rank or dignified by profession, within the limits prescribed by their own contracted and illiberal views.

It has been objected to the eloquent and splendid defence of our English Universities, affixed to the publication of a great scholar of the present day, that the author conceived it more consistent with prudence to dazzle his readers by a display of the powers of impassioned language, than to enter into a sober detail of what, it is alleged, he was apprehensive might shrink from the test of minute inquiry. This objection, then, unfounded as it is, I have here attempted to obviate, as far as it involves the merits of Cambridge; fully persuaded, that, whatever may be the inadequacy of the writer, an undisguised statement of facts will alone be sufficient to vindicate that renowned University, which justly regards Your Lordship as the able and firm supporter of its rights and privileges, from the obloquy of the political innovator, and the intemperate attacks of the unlettered enthusiast. With the warmest wishes for the undiminished prosperity of our common Alma Mater, and with an ardent expectation, that, when the tumultuous scenes of the present generation shall have passed away, this illustrious institution will remain an imperishable bulwark of religion and learning, I have the honour to be,

My Lord,

Your Lordship's very obedient
And obliged Servant,

LATHAM WAINEWRIGHT.

ADVERTISEMENT.

IN publishing the following pages, the author has been principally influenced by the suggestions of others. After reading the History of Cambridge, *recently published by Mr. Dyer, he has discovered nothing in that work to supersede the necessity of the present, either with reference to the information it is intended to convey, or to the principles which it incidentally inculcates. He trusts that in point of* correctness of detail, *but little will be found to call for animadversion, as he had the satisfaction of submitting his manuscript to the inspection of two members of the University, of learning and station, upon whose judgment he could place implicit reliance. It may not be irrelevant to observe, that though the author occasionally speaks in the first person, he has, during the last twelve years, ceased to reside in the University; but as he continues to be a* Member of the Senate, *he retains a vote in all its deliberative* *measures, and feels the highest interest in whatever is connected with the dignity and reputation of that learned body. He is not aware that he has said more than is requisite to enable the reader to frame a just opinion on the subject; but should he in some instances appear to be too diffuse, he must trust for his vindication to the words of Quintilian: "Non minus autem cavenda erit, quæ nimium corripientes omnia sequitur, obscuritas; satiusque est aliquid narrationi superesse quam deesse."*

THE

Literary and Scientific Pursuits,

&c.

"Quels sages, rassemblés dans ces augustes lieux,
"Mesurent l'univers, et lisent dans les cieux;
"Et, dans la nuit obscure apportant la lumière
"Sondent les profondeurs de la nature entière!
"L'erreur présomptueuse à leur aspect s'enfuit,
"Et vers la vérité le doute les conduit."

HENRIADE, Chant 7.

IN the wide range of human inquiry, if we except those political events, which still astonish us by their unexpected occurrence, there is no topic which has recently more occupied the public mind, than the principles and policy of general education. With all our acknowledged dereliction of duty, and amidst all the distraction inevitably created by the prolonged evils of warfare, an ardent zeal for the improvement of the mind, and an anxiety to diffuse the advantages of instruction among the lower orders of society, have in this kingdom been carried to such an unexampled extent, as to form one of the characteristic distinctions of the present age. It is no longer an axiom with legislators and statesmen, that ignorance is the best security against the revolutions of empire. It is no longer considered as an indisputable truth, that the business of private life is transacted with more regularity, and that the correctness of private morals is rendered less obnoxious to the tumults of passion, by excluding the great mass of the people from every acquirement which can tend to enlarge the conceptions and to humanize the understanding. Experience certainly affords no authority for believing that he is the most rigorously observant of the principles of justice and honour, whose mind is most devoid of rational ideas; and that he who is farthest removed from intellectual improvement, is best disposed to listen to the claims of gratitude and benevolence. A position less liable to controversy cannot well be imagined than this—that no man forms a worse subject of government, or a less useful member of the community, because his intellects have been expanded by the beams of truth and knowledge. To what extent, indeed, this cultivation should be carried, and what are the most efficacious means for accomplishing the object in view, so as at once to secure the subordination and to augment the happiness of social life, are points which, we might naturally suppose, would give rise to a diversity of sentiment; but respecting the expedience of affording the opportunity of instruction to the ignorant and depraved of every condition, it is scarcely possible that, in these enlightened times, more than one opinion should prevail.

It is an ancient observation, the truth of which, however generally acknowledged, has not on that account been the less disregarded, that the bulk of mankind, in their anxiety to avoid one extreme, are too apt to rush with heedless impetuosity into the opposite. They who have suffered in every aggravated form the oppressions of monarchical despotism, have, in their eagerness for the attainment of liberty, too often terminated their efforts in democratic anarchy; while, on the other hand, the same spirit which has actuated the people in demolishing the tyranny of some daring faction, has in many instances led them to submit to a state of degradation and slavery, equally injurious to their domestic happiness, though less destructive perhaps to their political prosperity. Thus it has also happened with too many of the enemies of Popery, who, in their zeal for abolishing every vestige of superstition, placed no restraint upon their rage for reform, till they had fallen into the wildest excesses of heresy and fanaticism. The same truth, it is to be apprehended, may be in some degree exemplified in the subject before us. Enchanted by the prospect held out of universal improvement, and misled by their admiration of the plans which have been recently introduced for the instruction of the young, there are not a few who imagine that they cannot sufficiently testify their ardour for the success of these modern institutions, except by depreciating the value of the ancient. They think it impossible to admit the utility of the new system, without proscribing, in the most unqualified terms, the very primeval principles of the old. After all that has been advanced by the excessive partiality of some, or attempted by the active temerity of others, still the peculiar advantages which belong to the mode of education now so deservedly encouraged by the patronage of the public, are principally conspicuous in its application to the poor. The communication of elementary knowledge is thus effected at a very trifling expense, and its benefits may be thus diffused to an extent beyond calculation. There are, however, some persons of sanguine temperament, who have expressed a firm belief that the same plan may be introduced with equal effect, into the higher departments of literature and the more elevated classes of society; but they are obviously unmindful, that what may be admirably calculated for the purpose, where the strictest economy is an essential requisite, and where the utmost ambition does not extend beyond the attainment of the simplest principles of knowledge, would be but ill adapted to a sphere of life, where an early foundation must be laid for polite accomplishments, and in many cases, for profound scholarship, and where the habits and notions of the individuals require a more polished as well as a more exact mode of tuition. It was the remark of a celebrated orator, long a distinguished ornament of the British senate, which, in its unperverted sense, is certainly entitled to our frequent recollection, that "to innovate is not to reform;" and, I believe, it will now scarcely be disputed by those who have been most accustomed to exercise their observation, that human systems, which have been newly created throughout every part of their texture, have seldom been attended with the same success as alterations and improvements cautiously effected in the constitution of those which have been long established. The effects of the former are frequently not visible till they are rendered so by approaching ruin; while, on the other hand, the latter have rarely given rise to evils of so destructive a nature, as not to admit of timely remedy.

Whoever is at all acquainted with those ephemeral theories of philosophy and religion which owed their existence to the frenzy of the French revolution, must unavoidably have observed that men then estimated the extent of their talents by their success in removing every vestige of opinions held sacred by the majority, and that he was considered as possessing the most brilliant intellect who was most daring in divesting the mind of every useful prejudice, and in recommending principles of action which had no other claim to admiration, than their repugnance to the authority and experience of past ages. But though subsequent events have in great measure corrected these aberrations from reason and truth, and though the contemplation of those tragic scenes which the last five-and-twenty years have crowded on our view *, have contributed to sober the extravagances of these revolutionary speculatists, yet

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* The present remarks were written before that lamentable reverse in the affairs of Europe, which is now defeating the results of the most sanguinary contest ever recorded in the annals of civilized nations, and which really sets all prospective reasoning at defiance. We are almost compelled to acknowledge that the principles of politics have been rendered, by the events of the present crisis, as difficult of comprehension to ordinary understandings as the differential calculus of Newton and Leibnitz is to the novice in science.

some particles of the poison still lurk behind, and occasionally show their existence, by producing effects which may ultimately prove injurious to the repose of society. To the remains of this once formidable passion for novelty may be traced that disposition to condemn some of our most venerable establishments, still observable in minds of inferior attainments, and that indiscriminate rashness which has led men of higher consideration in the community, to censure the plans which have been adopted, and the pursuits which are encouraged, in the two primary Universities of this empire.

There are even some who have ventured to proceed a step farther, and who have allowed themselves to believe, that to send a young man to finish his education at college in the present times, is, in truth, to introduce him into a scene of idleness and dissipation, where the tutors, lulled by luxurious ease, are indifferent to the encouragement and reputation of learning, and where science, if not despised, is at best cultivated with little success. These sentiments, so completely at variance with the real fact, appear to have principally originated in the mis-statements* and the exaggerated accounts which were published several years ago by a popular and respectable writer on education, who in his strictures upon the Universities, has included both in one sweeping sentence of condemnation; and, regardless of the accuracy so essential in the dissemination of pointed censure, has charged the defects and errors of the one, with equal and undistinguished violence on the other. It is certainly a point of no trifling importance, and one which is nearly allied to our national prosperity and manners, to ascertain whether these invectives and com-

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* Whatever foundation for just complaint may have existed at Oxford, when Dr. Knox published his treatise on Education, his observations are generally admitted by the candid, to have been overcharged even with regard to that University; but, when applied to Cambridge, they serve only to betray the prejudice and inaccuracy of the author, and his want of diligence in making the requisite inquiries. To deny the existence of any cause for animadversion in the latter establishment, would be to suppose a state of perfection never to be found in human institutions. Let any one, however, direct his view to the seminaries projected at various times for the education of those who call themselves *rational Dissenters* (to say nothing of similar foundations for the Independents and the Methodists), in which the defects and corruptions of the English Universities were professed to be avoided, and the acquirements of learning were to be accomplished with infinitely less toil and less consumption of time; let him observe the success of these visionary attempts, and ask where are now the academies of Warrington, Daventry, and Hackney, and what is the condition of the few which have escaped the wreck of their companions, and he will then be less disposed to indulge in unreasonable declamation against those venerable and magnificent institutions, which have endured the trial of so many ages, or to be led away by chimerical dreams of the possibility of ex-

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emption from practical error. A slight comparison of the different effects of the *established* and the *experimental* plans, will be sufficient to determine their respective merits. The very superficial attainments of the great body of *Dissenters*, acknowledged even by some of their own members, but to which I admit there are a few brilliant exceptions, will alone justify the reprobation of all their absurd and puerile schemes, which have arisen from their enmity against existing establishments, and from their once favourite doctrine of the *perfectibility* of man. Even to the most rational of the ideal plans, which have been formed by men of some ingenuity perhaps, but of more vanity, we might apply the remark of Baron de Grimm, speaking of the writings of Rousseau—"On est toujours tenté de dire, cela est très-beau et très-faux."

plaints are well founded, and to state to the world the merits and demerits of those ancient and opulent establishments, in which a large proportion of our senators and lawyers*, and the great body of the clergy, are destined to prepare themselves for the exercise of their respective functions.

In the observations and detail which occupy the following pages, I have confined myself to that celebrated Seat of Learning, which possesses the strongest claim upon my gratitude and veneration; and I hope to be able to evince, that the accusations which have been alleged against our Universities generally, do not apply to that of Cambridge, leaving the defence of the sister University to some of her numerous and grateful sons*. Let it not, however, be imagined, that the plan of education here described, will correspond with that ideal perfection, which the fancy of many may have pictured to them in radiant but delusive colours, or that it will not, in some particulars, admit of improvements, which might contribute to strengthen the interests of the republic of letters. I am not attempting to delineate what might be effected by the concentrated talents of all the wise and great, were it possible to obtain the result of their united counsels, but what has been long adopted with success, in the production of accomplished scholars and exalted characters; not what speculation may lead some few to imagine, might be attained with less obstruction from prejudice and error, but what is, in fact, openly displayed to the world, and is proved to be practicable from its acknowledged effects. Nor am I inquiring whether particular instances may not be pointed out, of individuals who have quitted the walls of their college with as slender a portion of learning as they possessed at their entrance, and who may perhaps have injured their fortunes and their health beyond the reach of aid. Such instances, we have reason to lament, will occasionally occur in the best-regulated societies; but unless the causes to which they are to be ascribed, can be proved to affect a numerous proportion of those who are placed in the same circumstances, they cannot be alleged as an argument of any force against the institution itself. The state of our collegiate discipline, I am persuaded, will be found greatly superior to the opinion too often entertained on this point; and it may be affirmed with confidence, that in the majority of instances of irregular and dissolute conduct, the culpability will attach more frequently to the folly and indulgence of parents, than to any defect in our academical restrictions. Notwithstanding the deficiencies and deviations of a few who absurdly suppose that a release from the severity of school entitles them to disregard the regulations of college, I believe it may be said of this illustrious establishment, that there is no society instituted for the advancement of knowledge, in which a greater number of its members can adopt with truth the sentiment of the younger Pliny, " Et gaudium mihi et solatium in literis; nihilque tam lætum quod his lætius, nihil tam triste quod non per has sit minus triste."

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* It was formerly a remark, justified by daily experience, that there was no class of men, unconnected with mercantile pursuits, whose knowledge was more exclusively confined to their own profession than that of lawyers. Since, however, the advice of Judge Blackstone has been more generally adopted, and it has become a more usual practice to send young men designed for the Bar, to one of our Universities, instead of paralyzing their faculties in the noxious atmosphere of an attorney's office, a visible alteration has taken place, and our English advocates more largely participate in those acquisitions of literature and science, by which the other learned professions have long been distinguished.

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* The alterations and improvements which have, within a few years past, been introduced into the Oxford system, have been laid before the world, by the late Poetry Professor in that University, who has since established an unequivocal claim to the praise of every lover of learning, by the publication of the Prelections which he delivered while he occupied the Professor's chair.

My more immediate object is to show, that in the University of Cambridge every student who comes properly prepared and well disposed —and without these qualifications, the instructions of a Newton would be of little avail—has the fairest opportunity of acquiring the most valuable knowledge, and of cultivating almost every species of science in the most advantageous manner. In order to evince the truth of this observation, it will be expedient to notice the different branches of learning which are there considered as the principal objects of attention, as well as the manner in which they are generally pursued. For our present purpose, these pursuits may not improperly be classed under three heads,—Classics and general Literature—Natural Philosophy and Mathematics—Morals (including Political Philosophy) Metaphysics, and Theology.

I. It has been often asserted, but has never yet been proved, that classical literature, so far from experiencing proper encouragement at Cambridge, is both despised and neglected; and it has been falsely imagined, that he who there aspires to academical distinction, must relinquish the fairy haunts of the Muses, and for ever renounce the society of the poets, the orators, and the sages of Greece and Rome, who had been the companions of his earlier days, and were destined, he had hoped, to contribute to the comfort of his maturer years. We have ample reason, however, to congratulate ourselves upon possessing a system of education, as comprehensive as it is strict and accurate, and which at once excludes a supposition not less erroneous than it is degrading. Whilst the student pursues the sublimities, and ascends with perseverance the craggy precipices of modern science, he neglects not to analyze the beauties and to trace the paths of ancient literature. The true state of the case is, that classical lectures take place in every college throughout that part of each term which requires residence, and uniform attendance is enforced with a proper degree of strictness. Those authors are selected which afford most scope for critical remark, and which at the same time are distinguished by a display of the higher beauties of sentiment and composition *. The

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* Were there no other proof of the high cultivation of classical learning in this University, it would be quite sufficient to refer to the erudite labours of the unrivalled Porson, to the admirable editions of the Greek dramas, published within the space of a few years by Professor Monk, Mr. Blomfield, and Dr. Butler; and to a recent periodical work printed at the Cambridge press, entitled *Museum Criticum.* In the difficult department of Greek Metres, it cannot be considered as any exaggeration to say, that there is no production of the continental scholars which can be at all compared to Professor Porson's Supplement to the Preface prefixed to his edition of the Hecuba of Euripides, or to Dr. Burney's "Tentamen de Metris ab Æschylo in Choricis Cantibus adhibitis." The favourable opinion which this

finest plays of the Greek Tragedians, Plato's Dialogues, the Histories of Herodotus and Thucydides, Aristotle's Poetics, Cicero's philosophical works, and the two treatises of Tacitus, might be enumerated as some of the more usual of the writings of antiquity chosen for this purpose. The advantages on these occasions do not consist merely in calling upon the student to explain the text of the author then in use, but principally in the opportunity afforded of hearing the criticisms of a learned and judicious preceptor, who, in addition to the result of his own researches, can frequently avail himself of manuscript observations not generally accessible. By this means it happens, that scarcely any striking beauties of expression, peculiarities of structure, or niceties of prosody, are suffered to escape the attention of his hearers.

Another instance, in proof of the attention which is required to classical pursuits, is afforded

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statement must create of the classical merits of Cambridge, might be still farther confirmed by referring to the dedication of Dr. Burney's edition of the Lexicon Technologicum of Philemon.

in the examination for the several *scholarships* attached to every college, in which, with a few exceptions, a proficiency in Greek and Latin is considered as more essential than skill in mathematics. The stipends annexed to these scholarships indeed are, generally speaking, but small, but still they are found by experience to be amply sufficient to attract competitors, and to create emulation. Nor must we omit to enumerate amongst these incitements, the excellent institution of *college prizes* *. Once or twice in the week, during term, according to the magnitude of the college, a particular day is appointed for the public delivery of two *declamations* by the undergraduates in rotation, to be composed in Latin and English alternately every year. By taking opposite sides of the question fixed upon for discussion, a greater degree of exertion is naturally required, the reasoning faculty is more vigorously excited, and a comparison between the different claimants is more easily effected. Nothing, in truth, can be more gratifying than to listen to these effusions of youthful genius, destined, perhaps, at some future period, to instruct mankind in wisdom, or to influence their actions by the powers of eloquence.

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* As a specimen of these annual *college prizes* we may mention, that at *Trinity* there are two prizes for Latin declamations and three for English, the former consisting of money and the latter of silver goblets: also £10 for the best essay on the character of William III.; the same sum for the best qualified student of those who are candidates for their Bachelor's degree; and two smaller sums for the two best readers in chapel, besides various prizes of books distributed to those who compose the two first classes at the annual examinations. At St. John's, prizes to the amount of more than £100 are annually conferred in a similar manner. Of these there is one for the best proficient in moral philosophy among the commencing Bachelors of Arts, and several for the best declamations and themes. In almost every college a short weekly composition, either in English or Latin, here

To this more private mode of encouraging the pursuit of classical literature, I must not

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termed a *theme*, is required from those undergraduates who are in their first or second year's residence, though the precise regulations may vary in our different societies: and if the example of St. John's College, in offering prizes for the best *themes*, were generally followed, it would certainly add very materially to the encouragement, which already exists, to a proficiency in prose composition.

neglect to add the *public* prizes and scholarships instituted for the same purpose, and which, by being open to general competition, afford a more trying scene to the efforts of literary ambition, and are on that account frequently more productive of meritorious exertion. Among the foremost of these are the *three medals*, which, in conformity with the will of Sir William Browne, are annually distributed to such undergraduates as prove themselves to be the successful claimants, by the following compositions: 1st, The best Greek ode in imitation of Sappho; 2dly, The best Latin ode in imitation of Horace; 3dly, The best Greek and Latin epigrams, of which the Anthologia and Martial are to be considered as the models. They are afterwards recited by the successful candidates in the Senate House, before the members of the University, and a numerous assembly of visitors. There are also *two medals* annually given by the Chancellor of the University, to the two best proficients in classical literature amongst those who have just obtained their first degree. In the present instance there is an excellent regulation—that no one shall become a candidate for these prizes, unless he was included in the two * first classes of honours, when he was admitted a graduate. A *third medal* has been added by the present Chancellor, the Duke of Gloucester, which is annually conferred upon the undergraduate who shall be adjudged to be the author of the best English poem, composed either in the lyric or the heroic measure.

The next prizes which merit the attention of persons unacquainted with the system at Cambridge, are those which are given by the representatives in Parliament of this University, to the authors of the four best *Latin prose dissertations*; and as they are confined to those who have taken their first degree, they contribute to remove the objection which has sometimes been made, that when once a student becomes a graduate, all farther incentive to exertion ceases to exist. The same observation is applicable to the *Seatonian*

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* It should here be observed, that the subjects of examination for the first degree (B. A.) consist of Natural Philosophy, Mathematics, Moral, Political, and Intellectual Philosophy; so that the above regulation secures the attainment of most of the different branches of academical learning.

prize, for the best English poem on a sacred subject, which is restricted to Masters of Arts. The two following prizes I have introduced in this place, because, though they are, strictly speaking, designed for the encouragement of theological learning, they contribute at the same time to promote a proficiency in English composition. The first of these, entitled the *Norrisian prize*, was founded by a highly respected individual (Mr. Norris), whose zeal for the diffusion of Christian knowledge, and whose singular generosity of mind, have, in more than one instance, claimed the gratitude of this University. He left an estate for the purpose of furnishing an annual premium to any member, under the degree of Master of Arts, who should compose the best essay, in *English prose*, upon some sacred subject, to be appointed by the Norrisian Professor of Divinity, and which is directed to be afterwards published. Similar to this is the *Hulsean prize* (so called from the founder's name), which is annually adjudged to the author of the best dissertation in *English prose*, on some point connected with the evidences of Christianity. The age of the candidate must not be less than twenty nor beyond thirty years; and the essay which obtains the prize is required to be printed *.

Besides these public prizes, there are not fewer than fourteen public scholarships, of which, while some are upon nearly the same plan of general competition, others are subject to some

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* Should it be an object of curiosity with any person to be made acquainted with the value of these public prizes, the following will be found to be a correct statement. Sir W. Browne's prizes consist of three gold medals, of the value of *five guineas* each. The Chancellor's prizes consist of three gold medals, equal in value to *fifteen guineas* each. The Members' prizes are *fifteen guineas* each, distributed in money. The Seatonian prize amounts to *forty pounds*, the Norrisian to *twelve pounds* (part of which is to be expended upon a gold medal, and the remainder in books), and the Hulsean likewise to *forty pounds*. It is a fact well deserving of notice, and which furnishes an ample reply to any objection to this part of the Cambridge system, that the *public* prizes, open to the competition of the whole University, amount annually to nearly *nine hundred pounds*, *three fourths* of which are appropriated to the encouragement of classical literature and English composition: and that the yearly amount of the smaller prizes peculiar to the different colleges, may be estimated at about *three hundred pounds*, *two thirds* of which are devoted to the same purpose.

few restrictions, but most of them are designed to promote the advancement of classical learning, and composition [*]. The last of these, entitled the *Pitt scholarship*, has been only very recently established out of the surplus money of the subscription raised for the purpose of erecting a statue, in the Senate House, to the memory of that illustrious character, Mr. Pitt; and which was increased by a donation from the members of the *Pitt Club*, formed in the capital. It is not always consistent with fairness of judgment, to estimate the merits of particular measures by their ultimate success; but it may surely be affirmed, without incurring the imputation of prejudice, that the late glorious termination of the long-protracted contests of Europe, must be ascribed to a strict adherence to the political system, so vigorously pursued by that eloquent and profound statesman: and it cannot but afford a source of grateful reflection, that whatever may have been the discordant opinions of the parties of the day, the admiration of his talents will at least be perpetuated in this earliest scene of his exertions, by the institutions of literature and the works of art.

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[*] The scholarships, here referred to, are the following: Two, called Craven scholarships, founded by Lord Craven; one founded by Sir William Browne; one by Dr. Battie; one by Dr. Davies, formerly Provost of Eton; and eight by Dr. Bell, one of the present prebendaries of Westminster; besides the Pitt scholarship.

Under this first division of pursuits, we may, without any great violation of propriety, class the public lectures on *modern history,* as well as those on the *laws of England.* The first course of lectures, on the former subject, were delivered by the late Professor, Dr. Symonds, whose learning and talents were displayed on this occasion, with equal advantage to his auditors and credit to himself. It has occasionally been remarked, and apparently with some degree of justice, that public lectures, upon any subject which does not require illustration from experiment, serve little other purpose than to afford amusement for an idle hour, or to procure emolument for some literary speculator. Were the generality of men sufficiently desirous of knowledge, to induce them to search for it in the numerous volumes within their reach, or could they always command that share of perseverance and attention which every intellectual pursuit must unavoidably require, I should in that case readily concur in the opinion, that attendance on lectures of this description would afford little more than rational entertainment. But, alas! the great bulk of mankind are too little solicitous about the acquirements of learning, to sacrifice their indolent habits in subduing its difficulties, without external assistance; and we may safely pronounce that the majority of those whom birth and fortune have distinguished from the rest of the world, would be destitute of much valuable information, were they precluded from recurring to this public and agreeable mode of instruction. It is not, however, a mere recital of facts which constitutes the substance of these historical lectures, especially as they are conducted by the present Professor. On the contrary, indebted to his acute and multifarious researches, they are replete with curious observations on the manners and customs of different countries, their various forms of government, and the maxims of policy which have prevailed in each; and they dwell with peculiar interest on all those grand topics connected with the welfare of nations and the principles of legislation, which render history and political economy so essentially requisite in the education of a statesman*.

Of similar utility are the lectures delivered by the Downing Professor of the laws of England. The admirable Commentaries of Judge Blackstone, it is true, now form part of the library of every gentleman; but though they are, without question, entirely elementary, and only profess to sketch the outlines of English jurisprudence; yet, to a beginner, they contain several difficulties which require elucidation, and not a few passages which may be rendered more attractive by the remarks of a skilful lecturer. The first and last volumes treat upon subjects so interwoven with the transactions of common life, that no one can be justified who does not render himself familiar with the information they contain. To every man who has the most distant prospect of becoming possessed of landed property, it is a desirable object that he should acquire a general acquaintance with the principal laws which regulate its descent, and the various modes of alienation to which it is subject. These particulars are discussed with conciseness and precision by this popular and constitutional jurist, in his second volume. The third volume is, perhaps, the least interesting to those who are not designed for the legal profession. The detail relative to the forms of proceeding in an action at law and a suit in equity, and the intermixture of technical terms, however necessary in a work of this nature, certainly do not claim any extraordinary share of attention from the general scholar, nor can they be supposed to afford any very refined pleasure to a mind ardently attached to the pursuits of literature. Some particulars there are, however, in this third volume, such as the description of the courts of judicature, and the history and law of the trial by jury, of too much importance to be included in the scope of the preceding remark. As it is highly probable that the "Commentaries on the Laws of England" will be always selected by the professor of the day, as the text-book to be recommended to his auditors, it must be a matter of no inconsiderable advantage to have those chapters pointed out to them, which may be omitted without affecting their knowledge of what is useful on the subject.—A course of lectures is also annually delivered in this University on the *Roman civil law*, by the Regius Professor of that faculty, of which an excellent specimen is afforded in the analysis published by the late Dr. Halifax, Bishop of St. Asaph. These lectures are principally attended by those who are destined to follow the profession of a civilian, and by those who in-tend to take their first degree in *law*, instead of the more usual mode of proceeding in *arts*.

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* The celebrated production of Dr. Adam Smith on the *Wealth of Nations*, notwithstanding its liability to objection in some few of its principles, still maintains the highest rank among the works which have been published on the comparatively modern subject of *Political Economy*. In that chapter, however, where the nature and condition of European Universities come under discussion, it may be affirmed with justice, that some of his positions may, to say the least, be considered as disputable; and that certainly the greater part of his remarks have long been totally inapplicable to our system of education at Cambridge. It is not improbable that the sceptical sentiments of the author, on the subject of religion, may have thrown a shade over his views of every thing connected with ecclesiastical institutions.

In describing the incentives to the cultivation of general literature, it is perhaps impossible to mention any thing more conducive to this great object, than a regulation which has been for many years adopted by several of our collegiate bodies; nor need I apprehend any inclination to dispute the truth of this assertion, when I name the *college* examinations *, which owe their introduction into this place of education to Dr. Powell, formerly Master of St. John's College. The students are examined once, and in some instances twice, every year, in the halls of their respective colleges, not only in classical and mathematical learning, but on various points of history, geography, chronology, and antiquities. At the termination, a list is formed of all who have passed this literary trial, in which the names are arranged according to their comparative merit, and rewards are allotted to those individuals who compose the two first classes. Many, to whom the acquisition of fame has no charms, and who are content "to keep the noiseless tenour of their way," may elude the severity of the general or university examinations, as well as some share of the opprobrium inseparably attached to ignorance and stupidity, by an open avowal of their aversion to the branches of science particularly appropriated to those occasions, and their total indifference to the attainment of distinction. But in these more private examinations, the number of candidates being smaller, and the contest lying between those who daily associate with each other, the abilities of each cannot fail to be properly appreciated, and a spirit of emulation is perhaps more effectually excited.

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* It certainly requires explanation why several of the smaller colleges should entirely neglect a plan which has been found by experience to be so productive of advantage; nor can the plea of a probable want of emulation from paucity of numbers be of any avail, till the trial has been fairly made.

II. We now proceed to the *second* division of those subjects of academical pursuit, which are adopted at Cambridge, and which comprehend *Natural Philosophy* and *Mathematics*. It seldom happens that an acquaintance has been made with these extensive departments of science at school, and hence we cannot feel much surprise, that when they are first held out to the student's attention, they should present a formidable aspect. But, however forbidding the commencement of these studies may appear, it has frequently been observed, that, after the obstacles which impede our early efforts have been surmounted, there are no branches of knowledge by which rational curiosity has been more gratified, the ardour of the mind more excited, and the reasoning faculty of the soul more strengthened and improved. It is true, indeed, that the celebrated and sceptical Gibbon, as appears from his Posthumous Works, relinquished the pursuit of mathematics, because he conceived that the habit of rigid demonstration, to which it accustoms the mind, is destructive of the finer feelings of moral evidence, which must determine the opinions and actions of our lives. The position, however, here advanced, is by no means supported by actual fact; but, on the contrary, it has been truly observed, that "almost all the best judges of moral evidence, and particularly the great modern advocates for the evidences of Christianity, have been mathematicians."

Attendance upon lectures on Geometry, Trigonometry, Algebra, Conic Sections, Fluxions, and the four mathematical branches of Natural Philosophy, in succession, is required in most of the colleges, every day, and in others, every alternate day; and if the enforcement of punctuality on these occasions is more necessary, it arises from that reluctance which these subjects are apt to create in the minds of those who have never been accustomed to the abstract reasoning of pure mathematics, or to the accuracy of philosophical induction. Numerous are the works which have been offered to the public, to facilitate the acquisition of geometrical science; and while some have only attempted to simplify the reasonings of Euclid, others have recommended plans for teaching the subject upon principles totally different, professing, indeed, to lead to the same conclusions, with equal strictness of demonstration, but with less obstruction to the comprehension of youth. But whatever arguments have been alleged in favour of these deviations from the beaten path, the University has, in my apprehension, acted wisely in adhering to the work of the great father of geometry, as presented to the world by his best editor. It may be true, indeed, that some of the difficulties discoverable in "The Elements," may have been obviated by the writers referred to; but it is also true, that in most of them objections are to be found, which more than counterbalance this boasted advantage. The demonstrations of Euclid, indeed, have rarely occasioned any serious obstacles to any one possessed of moderate capacity; and it is evidently more desirable to study the works of an author in their unaltered state, when no decided advantage is to be gained by abridgments and modifications.

It was not till within a few years, that any general text-book was made use of on the subject of Natural Philosophy, but each college adopted such works as appeared most eligible to the tutor, or those which custom had long established. No inconsiderable advantage has been derived both to the tutors and the students from the joint publication of Professor Vince and Dr. Wood, recently elected Master of St. John's College, which comprises in four volumes the following subjects—algebra, fluxions, mechanics, hydrostatics (including pneumatics), optics, and astronomy. The erudition and skill of both these highly distinguished members of the University, in the recondite parts of mathematical science, no one I imagine will hesitate to acknowledge. Whether indeed, in accommodating their talents to the apprehension of younger minds, they have in every case been sufficiently attentive to perspicuity of expression and simplicity of arrangement, has to some been a matter of doubt; but by uniting into one comprehensive work the substance of what is expected to be acquired on those subjects in every college, they have unquestionably afforded a fairer opportunity for the exertion of the student, than when he was left to depend upon the variable judgment of others for the choice of proper publications. In addition to the subjects contained in these volumes, the *college* lectures in this department, after having passed through the elements of *geometry*, *trigonometry*, and *conic sections*, terminate with propriety in the *Principia* of *Newton*. He, however, who understands the term *lecture* in its usual acceptation, will in the present instance be greatly mistaken; for one of the most prominent excellences which distinguish the plan adopted at Cambridge, consists in the personal exertions required from every individual. The student does not enter the lecture-room of his college for the sole purpose of listening with passive attention to the observations and comments of the tutor, but is called upon to prove the various propositions offered to his class, sometimes orally, but, in the generality of cases, by the more explicit and less fallacious mode of *writing.* By this plan of committing the several answers to paper, it at once becomes apparent how far the subject is really understood by each, and an easy method is furnished of estimating their relative merit. Many to whom a vivâ voce examination is formidable and embarrassing, are by this means enabled to call forth the full strength of their faculties, unawed by the dread of ridicule, and to display the result of their private industry, without any impediment, which might possibly arise from the presence of vigilant competitors.

During the third year's residence, every student who aspires to the honour of a *Bachelor's degree* is required to keep his *exercises* in the *philosophical schools.* They consist in public disputations before a presiding *Moderator*, whose skill in mathematical and philosophical subjects has been duly estimated before his election to that arduous office. Three questions, previously announced to the disputants, form the subject of their discussion, of which the first is usually one of the sections of Newton's Principia; the second, some point in Natural Philosophy, as the aberration of light, or the theory of the rainbow; and the third is taken from some moral, metaphysical, or political topic, as the nature of moral obligation, the reality of innate ideas, or the comparative merits of a limited monarchy and a republic. These questions the *respondent* is obliged to defend against the arguments of three successive *opponents*, which, being generally founded upon some fallacy, afford full scope for the exercise of acuteness and skill to each of the contending parties. Many persons who have been accustomed to hear of the absurdities practised, till very recently, in the schools at Oxford, and to despise those senseless forms which were only suited to the darker ages, have been led to entertain the same degrading opinion of the public disputations at Cambridge. So far, however, is this from being the fact, that I may venture to affirm, that, conducted as they generally are, they not only excite much preparatory exertion, but they produce at the time a most beneficial contest of mental acuteness, and require no inconsiderable share of information on the appointed topics of dispute. It has been objected by many who fully admit the utility of these scholastic exercitations, that they are carried on in the Latin language; and since this certainly cannot be said to promote the attainment of classical correctness, but, on the contrary, since it must, in many instances, tend to impede that unembarrassed expression of thought so desirable on these occasions, I think it might be an improvement to adopt the use of the vernacular tongue, though I acknowledge it to be an object of no essential importance *. Before these

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* One advantage the present plan seems clearly to possess, in checking that cacoëthes loquendi, which the most ignorant are too frequently the most prone to indulge; and with respect to those who have been educated at a public school, the objection, perhaps, vanishes altogether.

disputations take place in the schools, the study of the works of Newton commences; but it does not often happen that they occupy much attention till the last year of residence. It is certainly a reflection, not a little flattering to this University, and affording an unquestionable indication of our advancement in science, that the Principia of Sir Isaac Newton, a work which on its first appearance in the world baffled the comprehension of some of the most renowned mathematicians of Europe, is now read with facility, and studied with pleasure of no ordinary kind, by many of our undergraduates who have scarcely attained their twentieth year. To those who regulate their opinions by their own attainments, and who are accustomed to measure the utility of any species of knowledge by its tendency to promote the acquisition of wealth or power, this ability to comprehend the sublime reasoning of that transcendent and immortal genius, may probably appear to be an object unworthy of youthful ambition. We can easily believe, indeed, that, to the minds of men debased by a perpetual commerce with the sordid part of society, the sentiment of the

Roman orator must be utterly beyond the most laboured conception: "Inest in eadem explicatione naturæ, insatiabilis quædam e cognoscendis rebus voluptas; in quâ unâ, confectis rebus necessariis, vacui negotiis, honeste ac liberaliter possumus vivere*:" but to those who view with feelings of delight the intellectual improvement of the human race, and who think that every advancement in knowledge carries us another step towards the possession of genuine happiness, this superiority above our ancestors will appear to be not less honourable to the system of education in which it originated, than decidedly encouraging to our future prospects.

Several of the public and private scholarships also require a certain degree of proficiency in the subjects of this second class, and two prizes were instituted by Dr. Smith, formerly Master of Trinity College, and the author of one of our most valuable works on Optics, for the exclusive encouragement of the pursuit of mathematics, which are annually conferred soon after the general examination in the Senate House.

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* Cic. de Fin. lib. iii.

Under this second division of academical pursuits at Cambridge, may properly be placed the *public* lectures *on physical science.* Of these, the first which claims our notice is the course of lectures, delivered by the Plumian Professor, on experimental philosophy, explaining the principal phenomena of the natural world, in a plain and perspicuous manner, with no other admixture of mathematics than a reference to general results. No one, who is at all competent to decide, will deny that it is impossible to convey just and distinct ideas respecting the causes which operate in producing the various appearances of nature, and their peculiar mode of acting, by any other expedient than experiment. To say nothing of the durable impression this method is calculated to produce, it may with truth be affirmed, that the most correct and best executed engravings can afford but a very inadequate conception of the theories and facts they are designed to explain, and perpetually leave the student embarrassed by the intricacy of the diagram, or by the impossibility of preserving the rules of perspective. Let it not be forgotten, however, by those who are desirous of becoming proficients in this interesting branch of knowledge, that *experiment* without the aid of *mathematical* learning, however it may contribute to gratify the curiosity of the mere sciolist, can never effect the formation of the real philosopher.

Next to these, in point of utility, the lectures on *chemistry* have the best claim to our attention. Chemistry has been so much the object of attention within the last fifty years, and has given rise to so many inventions of the highest concern to the well-being and comfort of civilized society, that it is now become almost discreditable for any person, who professes to have received the education of a gentleman, to be entirely ignorant of its principles and facts. The able and distinguished Prelate who now holds the regius professorship of divinity, was one of the first persons who regularly lectured on this science in the University; and the Essays, which he afterwards published, contributed, in no small degree, to obtain popularity for a subject which was before supposed to be possessed of little attraction. Since the first appearance of this publication, chemistry has made many gigantic strides*; and such has been the ardour of research which actuated its admirers, as not only to give birth to discoveries of the highest interest, but to occasion a total revolution both in its principles and its nomenclature *. The phlogistic theory, so long prevalent in Europe, which found its most strenuous, as well as its last advocates in England†,

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* Notwithstanding the assiduity and devotion with which this science has been cultivated for many years, the recent researches of Sir Humphrey Davy have plainly shown that it is still in its infancy. No two substances were apparently marked by more distinct and unvarying characters than *acids* and *alkalies*, and yet the experiments of this very acute philosopher, which led to his discovery of the new metals designated by the appellations of *potassium*, *sodium*, and *ammonium*, have tended to confound this distinction, or at least have entirely altered our opinion respecting that essential difference which, till then, was supposed to subsist between them. Even the French theory of combustion has been rendered questionable by some of the last experiments of Sir H. Davy, in which this phenomenon has been observed to take place without the presence of *oxygen*. Highly valuable as this science must, beyond all doubt, be considered, yet the present uncertainty of its first principles is sufficient to justify its exclusion from our academical *examinations*.

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* The merits of the new system of chemical names have justly been the object of universal admiration; and were it possible that every science could imitate the *nomenclature* of chemistry, and the *classification* of botany, the advancement of the mind in its various acquirements would evidently be free from all those obstacles which now so often arise from technical language, unconnected with the ideas it is designed to convey, or from the perplexity not less frequently produced by the want of lucid arrangement.

† It is rather a singular circumstance that the same individual who, in modern times, has shown the greatest pertinacity in contending for the errors of Unitarian theology, should have been the most persevering defender of that system of chemical philosophy which has been proved to be completely false, and which his own experiments have, in fact, contributed to subvert. In both cases the triumph of his adversaries has been complete. While, however, I consider myself justified in censuring the rashness of Dr. Priestley as a polemic, rendered still more reprehensible by his want of scholarship, I feel no disposition to detract from the fame he has acquired as a philosopher, though engaged on the unsuccessful side. But I cannot forbear mentioning a strong contrast to his character in the instance of Mr. Kirwan, so long the able advocate of the theory of phlo-

at length gave way to the system introduced by the French school, and which, since the death of Lavoisier, has been acquiring strength every hour. Hence it has necessarily happened that the learned Bishop's work has lost part of its original utility, though it still contains much information, delivered in a style well adapted to the views of the general reader; and hence our academical lectures have assumed a more scientific form, and of course comprise all those varied improvements which the zeal of modern chemists has crowded upon the world.

Closely connected with this subject, one of

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giston. It certainly affords an example of magnanimity (for it can be called by no other name) rarely to be met with in the records of science, that a man, who had devoted the greater part of his life to the defence of a favourite system, should at length be induced, by the force of argument alone, to divest himself of all his former prejudices, to abandon for ever what he had long considered as the legitimate result of his most laborious exertions, and to adopt opinions diametrically opposite. Nothing but an extraordinary share of candour could enable him, at so late a period, to perceive his errors, and nothing but the genuine spirit of philosophy could lead him to renounce them.

the most useful series of lectures delivered in the University, is that which owes its origin to the active mind of the present Jacksonian Professor of Natural Philosophy. Mr. Farish commenced this course when he filled the professor of chemistry's chair, in consequence of his finding the peculiar subject of his office pre-occupied by another lecturer. Certain it is, that he could not have selected any department of knowledge more replete with utility and interest than the *application* of *chemistry* and *natural philosophy* to manufactures, agriculture, and the arts; and comprehending, as his plan of necessity does, so wide a range of objects*, nearly allied to the concerns of common life, it cannot but afford the highest gratification to every inquisitive and intelligent mind. In what manner this task is executed, they who have enjoyed the opportunity of attending these lectures need not be informed; but it would be an act of injustice to omit stating that no trouble and expense, no exertion of mind, or toil of body, have been wanting on the part of the Professor, to acquire the best-founded information on the numerous points which his plan embraces, and to illustrate the inventions and processes of the manufacturer and the artist, by models at once ingenious, accurate, and satisfactory. The in-

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* To enumerate the various topics which form the substance of these lectures, would be only to copy the articles detailed in the syllabus. Metallurgy in all its departments, mining, and the smelting of ores, the modes of purifying and compounding the metals in common use, with a description of the manufactures in which they are concerned; the processes of procuring and preparing sulphur, alum, nitre, salt, and other chemical substances, with the different purposes to which they are applied, not omitting the theory and manufacture of gunpowder; the inventions and plans which have been adopted in agriculture for bringing the vegetable

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and animal substances, which constitute the materials of human food and clothing, to a state of the greatest perfection, with an explanation of the implements recommended for the abridgment of labour; a description of the arts of weaving, dying, bleaching, and printing cotton and wool, and also of engraving and etching on copper; the nature of complex machinery, and the mode of working it by steam, together with the construction of canals, locks, aqueducts, bridges, harbours, and the principles of naval architecture; these, and numerous other particulars, are comprehended in the plan of this most useful course.

genuity, indeed, displayed by Mr. Farish in the construction of these models has frequently excited just admiration, particularly in cases where the greatest variety of movements and complexity of mechanism are designed to be explained to his auditors. So much interesting information is communicated in these lectures, that they unquestionably merit the attendance, not only of that class of young men who are destined to the inheritance of independent property, but of every member of the University who is desirous of extending his view beyond the limits of abstract science, and of observing the progress of society in adding to the accommodations and refinements of ordinary life. It will not, perhaps, be too much to assert that the two courses of lectures, on modern history, and on the application of chemistry to the arts, as they are now delivered in the University of Cambridge, may be considered as superior to any prelections of a similar description, within the boundaries of the united empire.

The series of lectures on *mineralogy*, delivered by Dr. Edward Clarke, already well known to the world by the publication of his

Travels, are of recent date, as they only commenced shortly before his appointment to the office which he now holds, and which was founded by the University seven years ago, in a manner highly flattering to his talents and acquirements. When it is stated that the establishment of this professorship took place in consequence of the opinion entertained of Dr. Clarke's lectures on the subject, during the two preceding years, it must be altogether needless to enlarge on their acknowledged merit*.

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* The plan which the Professor pursues is in some particulars peculiar to himself. Besides the usual information on the subject, it contains remarks on the natural history of the various materials which have been adopted, both in ancient and modern times, in *architecture* and *sculpture*, and professes to elucidate the knowledge possessed by the ancients of mineralogy, as it is displayed in the sacred Scriptures, or in the writings of the Greeks and Romans. The numerous specimens which Dr. Clarke collected on his travels, are deposited in an apartment appropriated for the purpose, and are open to public inspection. The University is much indebted to this enlightened traveller for the present of some venerable fragments of Grecian art which now adorn the vestibule of the Public Library; and it is much to be lamented that it cannot boast of pos-

There still remain to be noticed two other courses of lectures on the principles of *anatomy*, and on the use and abuse of *domestic medicine*. And here it must be confessed, that whatever may be the extent of merit we claim in other respects, the science of medicine does not receive that share of attention, to which, from its supreme value, in our estimate of human com-

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sessing the valuable MSS. offered by the same gentleman, but which have since been disposed of in another quarter.

The present respected Professor of Botany has for some years discontinued his lectures on that subject; but they who are disposed to follow this pursuit, either with a professional view or as an elegant amusement, have within their reach the means of accomplishing their object in a manner infinitely superior to any oral instruction whatever. I believe it is acknowledged by the best judges, that the Botanic Garden at Cambridge contains one of the finest collections of plants in the kingdom, and is only inferior to the Royal Garden at Kew. The class *Cryptogamia* may probably form an exception to this statement. He who possesses the advantage of constant access to this extensive collection, together with the works of Professor Martyn and Sir James E. Smith, the president of the Linnæan Society, can well dispense with the assistance of lectures, in acquiring the elements of this popular branch of science.

fort, it is evidently entitled. As one proof of this assertion, may be adduced the lectures referred to, as delivered by the late Professor of Anatomy, which, however amusing in themselves, and however sufficient for conveying competent information to the man of general knowledge, could, certainly, lay no claim to the character of scientific; nor were they by any means calculated to promote that proficiency which is now considered as essential, even to the practitioners of pharmacy. There can be no question, I imagine, that at present Edinburgh and London are the two first schools for the healing art in the British dominions; but it is surely extremely unreasonable, to make use of no harsher epithet, that the defective application of the means in our possession, should compel a numerous class of those who are designed for the medical profession, to resort to so remote a place as the capital of Scotland, for that theoretic knowledge which ought to be supplied from our own resources. The regulation passed by the College of Physicians not many years ago, which imposes the necessity of graduating in an English University upon all who are candidates for becoming fellows of that learned body, and the establishment of the Downing Professorship of Medicine, in the year 1800, will probably be the means of introducing, at no very distant period, a more effective mode of qualifying our medical students*.

III. We are now arrived at the last division of the primary pursuits which are encouraged in the plan of education adhered to in this University, comprehending *Moral* and *Political Philosophy*, *Metaphysics*, and *Theology*. Attendance upon lectures on the first of these subjects, is required in each college, during one term of every year, when a text-book is adopted, and the students are examined both vivâ voce and by writing. The work which has for many years been universally selected for this purpose is, "The Principles of Moral and Political Philosophy," by the incomparable Archdeacon Paley. Nothing can show in a stronger point of view the good sense and liberality of the college tutors at Cambridge, than the adoption of a work which is composed in the true spirit of philosophy, and which is distinguished by no common share of originality of remark and impartiality of judgment. It is impossible that any treatise of this nature, however characterized by sagacity and moderation, should be entirely free from objection and error; and though this is in a few particulars the case with Dr. Paley's work, yet, considered as a whole, it is amply entitled to our admiration and praise. Notwithstanding its conciseness, it contains almost every thing which is essential, and displays a perspicuity of style and a happiness of illustration rarely to be met with in writers on science. Considering how averse the generality of young men are to moral disquisitions when first presented to their notice, the world is essentially indebted to this most able and acute divine, for rendering a subject, so little attractive in the estimation of the many, both intelligible and interesting to the plainest understanding*; and indeed we may almost adopt, in the case before us, the language which Cicero applies to Socrates, in his Tusculan Questions;—"Primus philosophiam devocavit e cœlo, et in urbibus collocavit, et in domos etiam introduxit." The celebrated productions of Clarke, Wollaston, Butler, and Hutcheson, furnish the lecturer on these occasions with sources of illustration and remark; but, taken separately, they cannot be considered as at all comparable to the work of Dr. Paley, for the purposes of academical instruction.

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* Let it not, however, be imagined that I mean to insinuate that a student, designed for the medical profession, cannot acquire such a portion of valuable learning at Cambridge, as will enable him to become a more accomplished physician than if he had never resorted to the University. All I mean to affirm is, that more might be expected from the ample provision which has been made by the establishment of three professorships for the advancement of the science of medicine, than is actually effected.

On the subject of *Metaphysics*, or, to use a term less formidable to modern ears, of the

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* One of the peculiarities of Dr. Paley is, the talent which he possesses of placing the objections and arguments of his adversaries in the strongest possible light; and when they are clearly refuted by the subsequent reasoning, this method certainly tends to produce a greater impression, and a more decided conviction: but this art, I apprehend, would not be perfectly safe in any but the hands of a master.

Philosophy of the Mind, Locke's Essay on the Understanding has long been the standard book of examination; and this, with the elementary works of Watts and Duncan on Logic, are considered as abundantly sufficient for conveying a competent knowledge of the structure and operations of the human intellect. Since the time of that great philosopher, some few errors, indeed, have been discovered in the admirable system which his sagacity led him to form, by applying the principles of Lord Bacon to a science too long subject to the tyranny of Aristotle. These errors principally relate to his opinions on the nature of language and abstract ideas (to say nothing of his chapter on power); but, as the fundamental parts of his work remain unshaken, that circumstance will not diminish its general utility, when properly explained by a judicious preceptor. The publications of Dr. Reid, Dr. Beattie, and more particularly of Professor Dugald Stewart, are frequently referred to in the lecture-room, though they are not used as books of examination; and I have occasionally heard it remarked as a matter of surprise, that the writings of Dr. David Hartley*, one of the greatest ornaments of this Univer-

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* In mentioning the few points of objection, which have been urged against Mr. Locke's system, it should be observed, that it is the opinion of Dr. Hartley, that our most complex ideas are all derived from *sensation*; and that, therefore, the former is erroneous in making *reflection* a distinct source. At the same time he admits the error to be of little consequence. "We may conceive," observes Dr. H. "that he called such ideas as he could analyse up to sensation, ideas of sensation; the rest, ideas of reflection, using *reflection* as a term of art, denoting an unknown quantity."—Respecting Dr. Hartley's celebrated theory of solving the phenomena of the human mind by the agency of *vibrations* and *association*, the former of these doctrines is certainly subject to great difficulty of actual *proof*, whatever *presumption* there may be in its favour: but the operation of the latter principle is so consonant to our general experience, and so well supported by clear and forcible argument, that it may be considered as established beyond all reasonable doubt.

When I observe that the valuable works of the Scotch philosophers on this subject are frequently referred to in the lecture-room, I do not mean to intimate that their peculiar theory respecting the origin of our ideas and principles is either approved or recommended. If I am not mistaken, their singular doctrine of a *common sense* is still principally sity, should not also be recommended to the attention of the student. I am perfectly persuaded, however, that the profound researches of this celebrated metaphysician are but ill adapted to the purposes of college lectures, and that where a taste for this science really prevails, it can only be pursued with advantage, to its full extent, in the retirement of the closet. Whatever attachment particular individuals may feel to these speculative inquiries, I apprehend that no one who is free from the contracted sentiments of those who despise every pursuit unconnected with their own, would wish to see the subtle controversies respecting the materiality of the human soul, or the freedom of the human will, substituted for studies of more practical utility, and which are exempt from those acknowledged difficulties so apt, in younger minds, to engender a disposition to be more easily captivated with objections, than to be satisfied with preponderating evidence.

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confined to Scotland; nor is it likely to obtain any cordial reception in our English Universities, till it is supported by less objectionable evidence than has hitherto been advanced in its favour.

As so large a proportion of the students of the University are designed for the *sacerdotal order*, it will naturally be expected that an ample provision has been made for the acquirement of that species of learning which this important profession peculiarly demands. Complaints, however, have sometimes been made, that this provision is in many respects defective, and that it is by no means commensurate with the wishes of those to whom the ordination of the clergy is assigned by the church. Whatever cause for objection may formerly have existed on this point, it has for many years been almost entirely removed, and an opportunity is now afforded to every intended ecclesiastic, I do not say of completing the character of a profound theologian, which can never be effected during any academical course of studies, but of acquiring such a competent knowledge of the various branches of divinity, as will qualify him for passing a very respectable examination previously to his admission into holy orders. In some colleges one term of every year, and in others one day in the week, is appropriated, in the lecture-room, to the Greek Testament; and, unless counteracted by particular circumstances, the critical remarks of the lecturer, and his judicious use of the labours of former scholars and commentators, must be the means of exciting a desire for biblical information, and of forming a taste for biblical pursuits. And here we cannot but observe the vast superiority of the mode of studying the Sacred Writings, recommended and enforced on these occasions, to the careless and superficial manner so common in dissenting institutions, where a notorious deficiency in classical and oriental literature, and a general ignorance of the laws of just criticism, must obviously give rise to a mistaken interpretation of the original text, and to the consequent formation of erroneous opinions.

Whether a new and more correct translation of the Scriptures should be substituted by public authority, for that which is now in common use, is a question which has frequently been agitated with considerable warmth, and still continues to divide the opinions of many of our best divines*. Notwithstanding the objections which may be urged, and many

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[*] There is one point evident beyond all question—that every translation, framed with the view of favouring the doctrines of any particular party, similar to that of the New Testament, not long ago introduced by the Unitarians, for the use of their own sect, can merit nothing less than unmingled disapprobation. The scanty portion of critical skill possessed by the disciples of Socinus, in common with every other class of dissidents, forms no mean security against the prevalence of their labours, amongst men armed with the learning of an English University; but still it is the part of policy to guard against their attacks, when made in a direction where alone they have any chance of becoming effective—amongst those who lay claim to a more than common liberality of opinion, but which is ill supported by their literary attainments. Amidst the heterogeneous mass of commentaries and notes on the Scriptures, which are daily sent from the press by sectaries of every denomination, each strenuously contending for his own peculiar errors, we have great reason to rejoice at the task which has been undertaken by two able divines of our own Establishment, under the auspices of the Primate; and we may entertain no unreasonable hope that the edition of the Bible, now publishing with notes by Mr. D'Oyley and Mr. Mant, will powerfully counteract the effects of the former, and will prevent the rational part of the community from becoming the dupes of ignorance and fanaticism.

there certainly are, against the proposal of setting aside the present translation, and of introducing another for the general use of the people at large, no one will hesitate to acknowledge that persons of higher education, and particularly those who are destined for the sacerdotal profession, ought not only to be aware of the errors which escaped the vigilance of the translators appointed by James I.; but to be perfectly acquainted with the text of the sacred volume, as established by the most eminent critics. This purpose can only be effected by enabling the students to peruse these writings in the original languages, and by rendering them conversant with the critical apparatus made use of in preparing the most correct editions of the Bible. The private application of the individual is unquestionably the grand source to which we are to look for the accomplishment of this design; but I may assert, without fear of contradiction, that the public *theological lectures*, now established in the University, will afford assistance of the highest value to all who are disposed to profit by the learning they communicate.

A most useful series of lectures is annually delivered by the Norrisian Professor of Divinity, at which the attendance of every candidate for orders is made indispensable. Commencing with the evidences of revealed religion, he proceeds to the history, explanation, and proof of the leading doctrines of Christianity, particularly as they are embodied in the articles of our own Establishment. An exemplification of this course is afforded in the lectures published by the late Dr. Hey, which, though they perhaps betray too great a want of attention to the style, contain a copious fund of instructive information, and are composed with a degree of candour and impartiality highly creditable to the amiable author. It was the regulation of the founder, that no candidate for this office should be elected under the age of thirty, nor beyond that of sixty; so that, in the present case, the subject of theology, besides the requisite learning and assiduity of the professor, must possess every advantage to be derived from that vigorous state of the faculties which usually accompanies the prime of life. I need scarcely observe that every rational friend to Christianity must rejoice at the recent establishment of *another course* of lectures by Dr. Herbert Marsh, who now fills the chair of the Margaret Professor of Divinity in this University. Not only have we ample reason, in the specimens of these lectures which have already appeared, to admire the acuteness and the acquirements of this distinguished biblical scholar; but we have the gratifying assurance that our students cannot avoid profiting by the experience of so learned a guide, to regulate their pursuits in this extensive science, and that they are no longer in danger of being misled by the intricacies of human speculation and controversy on the one hand, nor, on the other, of being encouraged to hope for the attainment of their object by self-instruction and divine inspiration*.

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* The title of Dr. Marsh's present publication is, " A Course of Lectures, containing a Description and systematic Arrangement of the several Branches of Divinity; accompanied with an Account, both of the principal Authors, and of the Progress which has been made, at different Periods, in theological Learning." One of the prominent excellencies observable in the writings of this learned divine, is an undeviating adherence to the genuine principles of the

Under the present head may be mentioned the office of *Christian Advocate*, which was instituted a few years ago, in compliance with

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Church of England. While the safety of our Establishment is exposed to the undisguised folly and intemperance of heterodoxy from without, it is not totally free from symptoms of treachery, even within its own battlements. We have not to learn the existence of a certain class of persons calling themselves *evangelical* Christians, who loudly assert their exclusive claim to the character of *true churchmen.* These men, we must recollect, are avowedly Calvinists, and it therefore becomes the University, as one of the powerful guardians of the national church, to oppose the progress of doctrines disclaimed by every rational interpreter of our Articles and Liturgy, and to watch the activity of those of its members who are known to be decided advocates for the gloomy tenets of the reformer of Geneva. It has been said, with what truth I will not undertake to determine, that one of our colleges has been considered as the nursery of these *evangelical* preachers. The character and talents, indeed, of our professors and leading men do not leave us much to apprehend on this point; but still every degree of vigilance should be exercised to counteract the influence of these principles on the minds of the younger students, that it may not hereafter be said, that as the Arminian Methodists originated at Oxford, the doctrines of the Calvinistic Methodists were zealously supported and patronized at Cambridge.

the will of a considerable benefactor of the University, for the purposes of resisting the attacks of infidels of the day against the fundamental truths of natural or revealed religion, and of exposing the fallacy of any new doctrines of heterodox tendency, which might happen to arise, and which might appear to be of sufficient importance to merit particular notice. For effecting these views, whoever holds this situation, which is tenable only for six years, is required to publish annually a dissertation in the English language, as long as he continues in office.—In addition to the measures thus pursued for promoting the advancement of theological learning, we must not forget the public prizes for encouraging the same design, which I have described in a former page *.

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* Besides these excitements of a public nature, there are a few scholarships and prizes, instituted in different colleges, solely for the encouragement of *Divinity*. Thus, at Christ College, there are four Divinity studentships (commonly called the *Tancred* scholarships, from the founder's name), each exceeding in value 100*l*. a year, and tenable for the period of eight years. It ought not to be omitted, that the same individual founded four other scholarships, on

With these provisions, unremittingly supported, it will not be denied that the student in divinity is in possession of ample means * for esta-

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a similar plan, at Caius College, for the encouragement of medicine. In the former College there are also two prizes, consisting of medals of the value of fifteen guineas each; one for the best Latin prose dissertation on the evidences of Christianity, and the other for the best English essay on some moral precept in the New Testament. At Queen's College there is likewise an annual prize of 10*l.* for the best composition on some theological subject.

* I confess myself among the number of those who are very doubtful as to the expedience of omitting any part of the present academical plan, for the purpose of allotting more time to the pursuit of theology; because I am persuaded that any improvements, thought necessary in this respect, might be easily introduced without that sacrifice. With this view of the subject, it might be wished that more attention were paid to the study of the Hebrew language; for though it is considered as a requisite qualification for a fellowship in some colleges, it does not constitute a regular and an essential part of collegiate literature. Whether it should be learned with or without the *Masoretic points* is a question, which must in great measure depend upon the period of life when it is commenced. To those who take up this pursuit early, there can be little doubt that an acquaintance with the vowel points will render their acquisition more complete, and in some respects more useful; but, on the

blishing that proficiency in the several branches of this comprehensive science, which will after-

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contrary supposition, there appears to be no substantial reason why their labour should not be facilitated by the methods recommended by Masclef, Grey, and Parkhurst, especially when we consider the little importance that can be attached to the correct pronunciation of a language, in which no attempt is ever made to compose, and of which no dialect is orally used by any class of people, except those who adhere to the Jewish persuasion. "Linguas hasce addiscimus," observes an oriental scholar of the seventeenth century, "non tam colloquendi causâ, quam intelligendi scripta monumenta Orientalium populorum." To the general student it can be but of little consequence whether, for example, the words יְהֹוָה אֱלֹהִים be pronounced *Jehovah Elohim*, as they are, with the points, or *Yeheveh Alehim*, without the points, since both are probably equally remote from the primitive pronunciation, which has been for many ages irrecoverably lost. And with regard to proper names, such as יעקב Jacob, יוסף Joseph, כנען Canaan, משה Moses, &c. which would certainly be liable to inconvenient variation, if not restricted to one mode, no learner can fall into any material error, unless we can suppose him to be ignorant of the popular way of pronouncing these Scriptural appellations. Nothing can be better calculated for promoting the easy attainment of Hebrew, than the tracts which have been published by that learned linguist, the present Bishop of St. David's; and it would be no small advantage, if the plan wards enable him to sustain the ecclesiastical character with credit to the sacred profession, with advantage to those who may come within the sphere of his influence, and with ability to encounter the numerous machinations of the enemies of religion. Much, after all, must depend upon the heads of the Church; for, in proportion to their strictness in requiring the qualifications and attainments necessary for the clerical office, in that proportion will they experience the gratifying expectation of seeing its duties properly discharged, and its utility permanently extended.

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he has devised of studying the sacred language, were universally adopted.

It is sometimes asked, what useful purpose is promoted by the professorships of Hebrew and Arabic, established in both Universities, when no lectures are delivered on the subject? To this we reply, that though lectures are in fact occasionally read on these topics (as is at present the case with the Arabic professor at Cambridge), yet the design of these institutions is not regularly to teach the elements of the languages in question, which is best effected by private tuition, but to afford encouragement to the pursuit of an object which presents but few attractions, and to the critical examination of those oriental dialects which would otherwise, perhaps, be speedily neglected, if not utterly lost.

Such, then, is the general outline of the literary course pursued at Cambridge by those whose object it is to take their degree in Arts in the regular manner, and who, in truth, constitute the great majority of students in the University. It is required by the statutes that every candidate for the first degree in Arts should have resided in the University the greater part of nine terms, which, unless interrupted by casual circumstances, occupies the space of three years. In the month of January of every successive year, all who have completed this required residence, and have kept the appointed exercises in the philosophical schools, are called upon to undergo a *general* and *public examination* before they can offer themselves for admission to the degree of *Bachelor of Arts*[*].

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[*] They who graduate in civil law and physic are not included in this examination, as their qualifications are scrutinized by their particular professors; and by a singular and absurd provision in the statutes, an exemption is claimed for the undergraduates of King's College. The sons of noblemen, and those who are considered *tanquam nobiles*, have the privilege of taking an *honorary* degree of Master of

This examination takes place in the Senate House, and commencing on the first Monday in Lent term, continues, with scarcely any intermission, for five days. The candidates, it should be observed, are previously divided into classes, each class consisting of those whose proficiency appears to be nearly upon an equality, as far as can be ascertained from their former disputations in the schools. There are three orders of distinction, termed *honours* *, held out to the

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Arts, without submitting to any previous trial of their talents; but, leaving others to defend the wisdom of this regulation, it must be observed that they possess abundant opportunities of distinguishing themselves in their college examinations, and by becoming competitors for the public and private prizes. And numerous are the instances which might be alleged, of men of elevated rank, since renowned, either by their display of parliamentary eloquence, or by filling with reputation the highest offices of the state, who exhibited no equivocal presage of their future celebrity in their vigorous contention for academical praise, and by acquiring the rewards of early merit.

* The appellations given to these three *orders of honours* can only be familiar to those who have been educated at Cambridge—*Wranglers*, *Senior Optimes*, and *Junior Optimes*. The envied student who passes the best examination in the Senate House is called the *Senior Wrangler*, a title

ambition of these literary competitors, and in each of these divisions or orders are contained from fourteen to eighteen individuals, though they are not restricted to any precise number; nor can any thing be better regulated for the excitement of emulation, and the complete developement of the mental powers. The exa-

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which, however singular it may appear to strangers, confers a reputation never forgotten in after-life. They who follow next in the same division, are respectively termed *second, third, fourth,* &c. *Wrangler.* In a similar manner, they who compose the second rank of *honours* are designated by the titles of *first, second, third,* &c. *Senior Optime,* as are the individuals of the last order, by those of *first, second, third,* &c. *Junior Optime.* All who from idleness or inability are not found to merit a place among the *honorati,* and who cherish as their favourite maxim the sentiment in the Ajax of Sophocles,

> Ἐν τῳ φρονεῖν γαρ μηδὲν, ἥδιστος βίος,

are merely arranged in classes; but even the οἱ πολλοι, as they are emphatically termed, take precedence according to their proficiency. It is also customary to print the names of those who have acquired honours in two separate lists, which are afterwards publicly recited and distributed in the schools, in the presence of the Vice-chancellor, the Proctors, and other officers of the University. One of these lists contains the names of the Wranglers and Senior Optimes, and the other those of the Junior Optimes; and they are respectively distinguished by the titles of the *first* and *second Tripos.*

miners principally consist of those *Masters of Arts* who have presided at the disputations in the schools, and who, at the same time, are most distinguished by their experience as preceptors, by their attainments in science, and by their acknowledged impartiality of conduct; and so scrupulously attentive are they to the duties of their arduous and, in many respects, ungrateful office, that it rarely or never happens that any real objection can be discovered to their decisions, in estimating the comparative merits of the numerous rivals for pre-eminence. Four days are appropriated to questions and problems in Natural Philosophy, and the various branches of mathematical science, commencing so low as with examples in vulgar and decimal fractions and the Elements of Euclid, and at length extending to the most difficult parts of Newton's Principia, Cotes's Harmonia Mensurarum, the analytical works of Dr. Waring, and to the more intricate propositions of the Fluxionary Calculus *. The remaining day out of the five, which, in point of order, is now always the fourth, is occupied by

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* In the much-admired critique upon La Place's *Méchanique Céleste*, contained in the XXIInd Number of the Edinburgh Review, one of the conjectural causes assigned

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for the limited progress which has, for several years past, been made in this country, in the *highest* departments of mathematical science, is the mode of studying this subject, pursued in the University of Cambridge. When the reviewer asserts that certain portions of Newton and other writers who treat of pure and mixt mathematics in the synthetic method, are required to be so completely learned, and so thoroughly impressed on the student's mind, as to enable him to answer, with the utmost readiness, the interrogations which may be offered to him, he certainly does not widely differ from the truth; but when it appears, by the succeeding remarks, that he considers this to be the *whole* which is required at the general examination for *degrees*, his statement becomes liable to the imputation of incorrectness. It is well known to those who are familiar with our mode of proceeding, that no inconsiderable part of the exercises in the Senate House, consists in the solution of problems which are framed by the examiners, with the express design of directing the student's exertion to questions which have not occurred in his former pursuits, or which, at least, have not appeared in that precise shape. But, in addition to this, those amongst the questionists who aim at being included in the two first lists of *honours*, *Wranglers* and *Senior Optimes*, when the Senate House examination for the day is terminated, are afforded *another trial of skill* at the examinations in Moral and Political Philosophy, Natural Theology, Logic, and Metaphysics*.

Moderators' private apartments, on two successive evenings. On these occasions a number of problems are placed before them of a more difficult nature, and which presuppose a more intimate acquaintance with fluxions and the higher parts of algebra. These questions necessarily vary every year, because they are generally framed by those who fill the office of Moderator for the time being, and they are certainly calculated to call forth all the ingenuity and invention of which the student is possessed. I have ventured to say thus much, because the observations of the reviewer, however just in other respects, appear, in this particular, to be founded on partial information.

* The different allotments of time assigned to these two branches of examination, may probably appear to many to be altogether disproportionate. But it should be recollected that the first class of subjects must, from their very nature, require a longer period for completing the solution of the questions proposed; and it also deserves to be mentioned in favour of these subjects, that they unquestionably impose the necessity of more laborious application, and excite a higher degree of mental exertion and acuteness, than any others which can possibly be named. With regard to the second class of subjects appointed for examination, one day, if actively employed, is sufficient to ascertain what proficiency has been made, and to enable the examiners to form a very

One very excellent regulation takes place in these examinations, to which I have already adverted, and which I cannot but consider as in many respects superior to the mode adopted by the sister University; and that is, that every answer is required to be given in plain unperplexed *writing*, even in those cases which admit of oral explanation. This method, while it removes the perpetual obstacle arising from embarrassment, is certainly conducive to a greater degree of accuracy, and at the same time creates

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satisfactory estimate of relative merit. The objection, that *classical literature* constitutes no part of this trial of the intellectual powers, though it is certainly entitled to *farther consideration*, is in great measure obviated by what has been detailed in a former page. In addition to the particulars there advanced, we might with justice adduce the "*Musæ Cantabrigienses*," and the specimens of Greek and Latin composition in *prose* which have, at various times, appeared from the Cambridge press, as no insignificant proofs of the proficiency of our younger members in this department of learning. And if it be asked, whence have proceeded the brightest scholars of recent times, whence have sallied forth, in "panoply divine," the Porsons, the Parrs, the Burneys, and the Wakefields of the age; with exultation we answer —from Cambridge.

no impediment to that readiness of reply which, though it is in many cases an indication of quickness of mind, is frequently nothing more than the result of undeviating application. To whichever plan the preference be given, it is obvious that he who answers with precision the greatest number of questions in the same portion of time, must be entitled to the honourable distinction of precedence. These written replies are respectively subscribed with the writer's name, and, at the close of each day, they are submitted to the careful perusal of the examiners, who keep an accurate register of the labours of the several candidates, accompanied with their appropriate marks of merit. At the conclusion of the fifth day*, after a laborious investigation of the accumulated papers, the arbiters complete their final adjudication; on the day following a list of the *honorati* is publicly affixed in the Senate House, and the scene terminates with the ceremony of admission to the first degree of Bachelor of Arts.

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* I should also mention, that, at the commencement of this last day of examination, another classification, or *bracketing*, as it is here termed, is made of the different candidates, as it has now become more easy to fix upon those who are possessed of nearly equal merit. This new arrangement, of course, brings the matter within a narrower compass, and adds fresh vigour to the contest, which is now to decide the final situation of each individual. The point of differ-

It is scarcely possible that any thing can be conducted upon a more liberal and a more impartial plan than the whole of this examination; and want of success among the competitors for distinction, can be imputed to no other cause than palpable deficiency in the requisite qualifications. A more gratifying spectacle cannot well be imagined, than a numerous assemblage of academics, glowing with the flush of youth, and animated by the fervour of hope, called upon to make their last exertion, before they enter into the tumults and struggles of human life. Many of them are possessed of brilliant and prophetic talents; most of them feel a more than

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ence is sometimes so imperceptible, that two antagonists are opposed to each other in a separate *bracket*, and it is not till after repeated trials, that any superiority can be discovered in either party.

ordinary incitement to emulate those who have long been their associates in the journey of literature; and all are compelled to make that strenuous, though, perhaps, short-lived effort which they trust will enable them to escape the imputation of disgraceful ignorance or mental inferiority*.

When we consider the defective points which are always to be discovered in the wisest systems of human invention, and recollect how rarely it happens that the most elaborate execution approaches the perfection of the original design, it appears impossible to avoid acknowledging that the plan of education pursued at Cambridge, though not, perhaps, entitled to our unqualified approbation, is certainly, in many essential particulars, more judiciously adapted to excite the ardour of youthful talent, and to call forth the dawning energies of the mind, than any similar institution in the British empire. Notwithstanding the recent improvements at Oxford, we may still ask with confidence, where can we meet with any place for completing the education of the higher and the professional orders of society, in which the refinements of literature and the depths of philosophy* have been explored with greater zeal, and more brilliant success? The pulpit, the bar, and the senate, proclaim, in language too loud to be disregarded, that the academic groves of Cam have more than amply contributed towards the cultivation and progress of manly eloquence,

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* When we witness the indefatigable application of those who then aspire to the *highest* situations of honour, when we hear of the laborious days, and the almost sleepless nights which they voluntarily pass in preparing for the approaching contest, we cannot help feeling the peculiar force of the exclamation of the most accomplished character of ancient Rome: Quid vero? qui ingenuis studiis atque artibus delectantur, nonne videmus eos nec valetudinis, nec rei familiaris habere rationem? omniaque perpeti, ipsâ cognitione et scientiâ captos? et cum maximis curis et laboribus compensare eam, quam ex discendo capiant, voluptatem?—Cic. de Fin. lib. 5.

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* It has sometimes been urged, as an objection against the Universities, that they have never been found to be foremost in any of the discoveries and improvements which have enlightened the world. In the first place, this observation is not true, particularly when applied to Cambridge; and, in the next place, it must be recollected that the Universities were not founded with the design of producing discoveries in science, nor even for the reformation of a corrupt taste, like the Arcadian Academy, instituted by Crescimbeni, but for the purposes of preserving and communicating sound

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learning, and of qualifying the young for discharging some of the most important functions in civil society. There is one peculiarity which, if I am not egregiously mistaken, marks the character of both Universities—that *merit* invariably succeeds in attaining the rewards to which it is strictly entitled, and that exertion in the cause of learning never remains unnoticed or neglected. Amidst the innumerable occupations, and the clashing interests of common life, the prizes, which form the object of popular ambition, frequently fall to the lot of those who have no better claim to them, than their freedom from the restraints of modesty, or their casual connexion with the rich and powerful. But, in these classic territories, the competitors for honour derive no benefit from the countenance of rank and opulence, and feel no difference in their chance of success, but what arises from inequality of native talent or voluntary effort. Stripped of every accidental appendage, and precluded from every undue assistance proferred by partiality, here, and, perhaps, here alone, merit secures the applause of the surrounding judges, and bears away in triumph the chaplet of victory.

of practical knowledge, and profound erudition *. And where, let me ask, has liberality

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* Before I conclude these remarks, I am desirous of rectifying an erroneous conception relative to Cambridge, which it has never been my fortune to hear expressed till lately. It has been urged, as a matter of complaint, that amongst our undergraduates at Cambridge there is a more marked and decided difference between *reading* and *non-reading men*, than there is at Oxford, and that, at the former, unless a student is conscious of possessing talents and industry sufficient to command pre-eminent distinction, he is compelled to resign himself, with little resistance, to the seductive charms of indolence and dissipation. The admissibility of this objection I may safely venture to deny, without incurring the charge of undue partiality. It appears, indeed, to have arisen from the reluctance which almost every student feels to call himself a *reading man*, unless he avowedly aims at the *highest honours;* and this reluctance is undoubtedly created by the apprehension of not fulfilling the expectations of his vigilant contemporaries. But, whatever may be the origin of the complaint thus alleged by those who are but imperfectly acquainted with our proceedings, there can be little to authorize its indulgence in an institution where there is a regular *gradation* of honours, and where the excitements to literary effort are at once numerous and studiously varied. Of those who succeed in obtaining a place among the *honorati*, widely different must be the exer-

of sentiment met with better supporters, Christianity with more illustrious champions, and

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tions and attainments displayed by the numerous rivals for priority, from the Senior Wrangler to the lowest Junior Optime: and of those who have no desire for distinction in the Senate House, many acquit themselves with the highest credit in their college examinations, and others afford a sufficient indication of literary talent in their contention for the public or private prizes. The objection, indeed, when taken in its full latitude, would insinuate that no encouragement is held out by the University, except to extraordinary talents and unremitting application, and that no opportunity remains for the improvement of that respectable mediocrity which falls to the lot of the greater portion of mankind, and which, not unfrequently, occupies with dignity the highest stations in society. Fortunately, however, this supposition is completely contradicted by the real fact. When we call to view the comprehensive nature of the excitements established by our Cambridge system; when we recollect that the Senate House honours are made to correspond to *various* degrees of merit; that an extensive range is opened for the exertion of *different* abilities by numerous prizes and scholarships, both public and private, in Greek, Latin, and English, in mathematics, natural philosophy, and theology; and, lastly, that the attainment of *Fellowships* is always the result of meritorious conduct, and frequently of a laborious trial of intellect, it must of necessity be acknowledged that an infidelity, in all its varied forms, with more commanding and successful opponents[*]?

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ample provision has been made to rouse the indolence of some by placing before them situations of profit, and to kindle the ambition of others by the prospect of collegiate fame. Such, in truth, is the general efficacy of the system as to create no inconsiderable portion of mental activity among many of those who openly disclaim all pretensions to the title, in its Cambridge acceptation, of *reading* men.

[*] In the enumeration of advantages possessed by the undergraduates of this University, I ought to have mentioned one, which appears to have little or no existence at Oxford—the liberal use of the noble *libraries*, which add so much to the dignity and reputation of the place. Besides the privilege of access to the library attached to his own college, every student has the power of borrowing ten volumes at one time, from the public or *University library*, by procuring a note from some resident Master of Arts. This fine collection, consisting of nearly one hundred thousand volumes, comprehends not only the accumulated remains of ancient learning, but almost every modern work of any value or celebrity. The Bodleian, on the contrary, is completely inaccessible to the undergraduates at Oxford; and even to those members of the University who possess the liberty of resorting to this splendid library, the value of the privilege is much diminished by the singular regulation which prohibits the removal of every book, without distinction, beyond the walls of the building.

Whatever illiberal reflections may have been advanced against the two Universities of the realm, by men either avowedly disaffected, or obviously indifferent to the welfare of our civil and ecclesiastical establishments, I may certainly venture to deny that at Cambridge, orthodoxy is maintained with any uncharitable disregard to the opinions of dissentients, or that a zealous attachment to the government of the country is inculcated upon any other ground, than because this preference is sanctioned by an impartial estimate of anterior times, and by the contemplation of the convulsive struggles, which have so long distracted the repose of continental Europe. Here, in the bosom of his Alma Mater, the student is taught, and taught with justice, to consider our Church Establishment as founded upon principles at once rational and sound, pure and practical; equally remote from papal superstition and the extravagances of sectarian fanaticism. Here he learns, and learns without delusion, to venerate the genius of our civil Constitution, and to perceive that its unrivalled excellence is as incompatible with regal despotism as with republican fury, and that while it reprobates the absurdity of an equality of condition, it respects and upholds an equality of rights. In these tranquil retirements of genius and taste, in these classic groves of learning and science, we trust that religion and liberty have formed an inseparable alliance:—not, indeed, that distorted religion, which engages the veneration of the enthusiast and the devotee, not that meretricious liberty which captivates the Utopian speculatist, or inflames the frantic demagogue; but religion, which rectifies the obliquities of human conduct, and liberty, which harmonizes the discordant interests of human society. In the one we shall find that meliorating influence, which subdues the impetuosity of the passions, without clouding the understanding, and from the other we shall derive all that can increase the enjoyments of social intercourse, without endangering the security of social order. The one is professedly friendly to a rational, an enlarged, and an enlightened faith; the other is as resolutely hostile to indiscriminate innovation and tumultuous reform.

"That man," observes the author of the

Rambler[*], "is little to be envied, whose patriotism would not gain force on the plain of Marathon, or whose piety would not grow warmer among the ruins of Iona." And he who in tracing the academic haunts of the wise and the learned of elder times, does not feel inspired by the recollection of departed excellence, and whose bosom does not, for one moment, glow with the fire of enthusiasm, must surely be regarded with sentiments not far removed from astonishment and commiseration. In vain shall we look for the love of literature in that cold and heartless being, who experiences nothing beyond ordinary sensations, when he contemplates the venerable pile rendered sacred by the residence of Newton[†], when he enters the chamber where Erasmus studied, when he is shaded by the tree planted by the hand of Milton, or when he treads the same path which was worn by the footsteps of Cowley, Dryden, or Gray. From minds of this complexion we can hope for no sympathy, we can expect no cordial approbation. It is only to men of an opposite character that we should ever venture to appeal, or to whose decision we can attach any value or respect. Calling then to mind the multifarious branches of human knowledge which are pursued with ardour, and cultivated with success, within the walls of our northern Athens; recounting from the pages of its register, the luminous assemblage of names*, dear to every lover of intellect, and immortalized in the memories of the wise and good; recollecting, that to this source we are

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[*] Journey to the Western Islands of Scotland.

[†] The rooms assigned by tradition to Newton and Erasmus are still pointed out at Trinity and Queen's, and the mulberry-tree is still standing in the garden of Christ College, which is said to have been placed there by Milton.

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* I cannot resist the opportunity, which here presents itself, of following a great example, and of mentioning the names of a few of those distinguished men, whose celebrity, it is true, no additional praise can increase, but of whom it is not always remembered that they were educated at Cambridge. They are inserted without any particular regard to chronological accuracy. Archbishop Cranmer; Bishops Ridley, Latimer, and Andrews; Archbishops Whitgift and Parker; Jeremy Taylor, the celebrated bishop of Down; Bishop Walton, the famed editor of the London Polyglott; Castel, who published the Lexicon Heptaglotton; Ockley, the Orientalist; Dr. Isaac Barrow; Cudworth; Spencer, the

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writer *de Legibus Hebræorum*; Joseph Mede, Dr. Seth Ward, bishop of Salisbury; Bishop Wilkins; Dr. Henry More, of Christ College; Lightfoot, the great Hebrew scholar; Pool, the author of the Synopsis; Bishops Beveridge and Kidder; Dr. Burnet, the master of the Charter House; Archbishop Tillotson; Bishops Cumberland, Patrick, Stillingfleet; Dr. Conyers Middleton; Bishops Hare, Sherlock, and Hoadly; Dr. Samuel Clarke; Dr. Sykes; Bishop Chandler; Dr. Waterland; Wollaston, the author of the "Religion of Nature;" Hartley; Dr. Rutherforth; Dr. Jortin; Bishops Newton, Hurd, and Law; Dr. Powell and Dr. Ogden, with numerous other great divines. — Bacon; Newton; Whiston; Oughtred; Roger Cotes, whose early death was so justly lamented by Newton; Colson; Dr. Robert Smith, the master of Trinity; Saunderson; Wallis; Henry Briggs, the improver of logarithms; Horrox, who made the first observations on the transit of Venus; Ray; Derham; Harvey, who discovered the circulation of the blood; Dr. Long, the master of Pembroke; Dr. Stephen Hales, the author of "Vegetable Statics;" Brook Taylor; Dr. Waring; Dr. Maskelyne, &c.—Chaucer (according to Mr. Tyrwhit, of Oxford); Spenser; Ben Jonson; Fletcher; Beaumont; Sir John Harrington, the translator of the Orlando Furioso; Bishop Hall, one of our earliest writers of satires; Donne; Waller; Cowley; Milton; Dryden; Otway; Andrew Marvel; Sackville, Earl of Dorset; Duke of Buckingham, indebted for the sublime discoveries of Bacon and Newton, for the unrivalled productions of

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author of "The Rehearsal;" Garth; Fenton; Broome; Prior; Lee, the dramatic poet; Ambrose Philips; Granville, Lord Lansdowne; Vincent Bourn; Gray; Mason.—Crooke and Sir John Cheke, both Greek Professors; Roger Ascham; Bentley; Davies, the learned president of Queen's; Joshua Barnes; Dawes, the author of *Miscellanea Critica*; Ashton; Markland; Wasse; Thirlby; Stanley, the editor of Æschylus; Taylor, the editor of Lysias and Demosthenes; Bishop Pearce; Foster, the defender of Greek accents.—Cowell, the eminent civilian; Dr. Stukely, Dr. Cave, and Peck, the antiquaries; Bentham, the historian of Ely; Sir Robert Cotton; Sir James Burroughs, the master of Caius, of architectural fame; Roger Gale, the antiquary; Laurence Sterne.—Sir Thomas Smith, secretary of state to Edw. VI.; Cecil Lord Burleigh; Sir Francis Walsingham; the great lawyer Sir Edward Coke; Lord Falkland, so justly panegyrized in Clarendon's History; Sir William Temple; Robert Nelson; Sir Thomas Gresham; Sir Robert Walpole; Horace Walpole, Lord Orford; Lord Chesterfield; and Soame Jenyns.—For names of more recent date, I refer the reader to the ample catalogue contained in the notes to the celebrated Spital Sermon of Dr. Parr.—In those who have arrived at years of maturity, and who fortunately find in the acquisition of knowledge its own reward, a recital, like the present, may serve no other purpose than to generate pleasing re-

Spenser and Milton, for the critical researches of Bentley and Porson, and for the intellectual and moral disquisitions of Hartley and Paley, we are not only led to venerate and admire this hallowed spot, which has produced the boasts and ornaments of human nature; we are not only impelled to deprecate every daring assault upon this citadel of our fairest hopes, but we are urged alike by the claims of interest and affection, to listen to every friendly admonition which may be offered, and to adopt every rational plan which can be devised, to advance its glory and ensure its duration.

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flections. But to those who are in the spring of life, to whom Philosophy is unfolding its earliest blossoms, the retrospect of those great and enviable characters who have adorned their country in past ages, must surely be productive of the happiest effects. It is of little consequence that the ardent expectations of the young are frequently disappointed. The animating influence of emulation is not, on that account, the less beneficial; and many who may never actually attain the object of their ambition, are yet successfully urged by the contemplation of the shining examples thus held forth to their view, to reject the solicitations of indolence and pleasure, and steadily to pursue the path which leads to honourable independence, to eminence of station, or to immortality of fame.

Amidst the magnificence and tumult of warlike achievements which have so recently filled the world with astonishment, ours have been the peaceful triumphs of truth over ignorance and infidelity; and while the spoils of vanquished nations have attracted the applause of the multitude, it has been the lot of our less conspicuous champions to display to the privileged few, the banners of knowledge and the trophies of science. The times, indeed, in which we live have been critical and perilous beyond example; and if this envied country has escaped the tempest of desolation and horror which overwhelmed the nations around us, we must not forget the causes which have produced this happy result. While the wisdom of our public councils, and the valour of our arms, have claimed the gratitude and admiration of Europe, in this arduous conflict, let us not be unmindful that our Institutions of Education, and particularly the two Universities, have been silently contributing towards the same effect. Nor need I apprehend the imputation of partiality, in asserting that, in that of Cambridge, we have witnessed the successful cultivation not merely of profound learning and refined taste, but of that manliness of sentiment, those high principles of honour, and those comprehensive views of liberty, which, we trust, will eventually effect the preservation of our dearest rights and our noblest privileges. Let us then indulge the fond expectation, that this favoured abode of the Muses will hold out the torch of truth to generations yet unborn, and will send from its portals a long succession of illustrious characters, who, while they enlighten and adorn the state, will invigorate and defend it.

Thus may the literary ambition of the young, in after-ages of the world, conduct them through the discipline of academic laws, and under the influence of academic praise, to the honourable pursuits of active life. Thus may the human intellect, expanding its native energies, and scattering the mists of prejudice and error, be making a continual advancement from one gradation of knowledge and improvement to another, till the hemisphere of science shall be illumined with all the irradiations of future genius, and decorated with all the splendour of future discoveries.

THE END.

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